SURFACE WATER AMBIENT MONITORING PROGRAM (SWAMP)

REPORT ON PENASQUITOS HYDROLOGIC UNIT (HU) SAMPLING BETWEEN MARCH AND SEPTEMBER 2002

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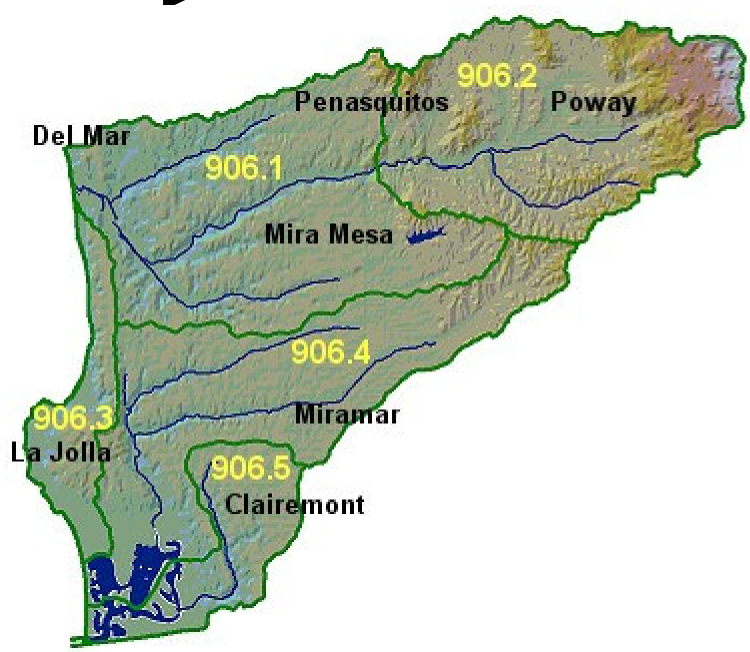

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1.0 INTRODUCTION

This report presents the results of the monitoring conducted in the Penasquitos Hydrologic Unit (HU) between March and September 2002 under the Surface Water Ambient Monitoring Program (SWAMP). The monitoring was intended to provide reliable, high quality information necessary to produce water quality assessment [305(b)] and impaired waters [303(d)] lists that are more comprehensive and more defensible than those of past years.

The primary objective for this SWAMP report is to identify specific locations of degraded water or sediments in rivers, lakes, near shore waters, enclosed bays, or estuaries using several critical threshold values of toxicity, water column or epibenthic community analysis, habitat condition, and chemical concentration.

1.1. ORGANIZATION OF REPORT

The report begins by discussing the general characteristics of the Penasquitos HU, identifying major water bodies and their beneficial uses. This background section includes brief discussions of the section 303(d) water quality impairments, land use and political boundaries, other monitoring programs that either are underway or recently have been completed, and stakeholder actions within the HU.

The body of the report discusses the SWAMP methodology applied during the study, and provides the monitoring results, an analysis of the data, and conclusions related to the SWAMP objectives. The report then briefly correlates the SWAMP data with the data from the MS4 storm water NPDES monitoring and other programs to determine if there are opportunities to maximize sampling with changes in required programs.

The report concludes by discussing suggestions for improving the SWAMP program, as well as for overall monitoring in the Penasquitos HU. These suggestions include possible actions to maximize monitoring resources, the application of existing monitoring data for multiple purposes, and suggestions for future SWAMP resource allocation within the Penasquitos HU.

2.0 PENASQUITOS HYDROLOGIC UNIT BACKGROUND

2.1. DESCRIPTION OF WATERSHED

The 101,456 acre Penasquitos HU extends from the Pacific Ocean inland through portions of the City of Poway and east of Highway 67 to the Iron Mountain area. The northern boundary includes a portion of the City of Del Mar and the community of Rancho Bernardo; the southern boundary transects the Marine Corps Air Station at Miramar and portions of the City of San Diego, south of Mission Bay (Figures 2-1 and 2-2).

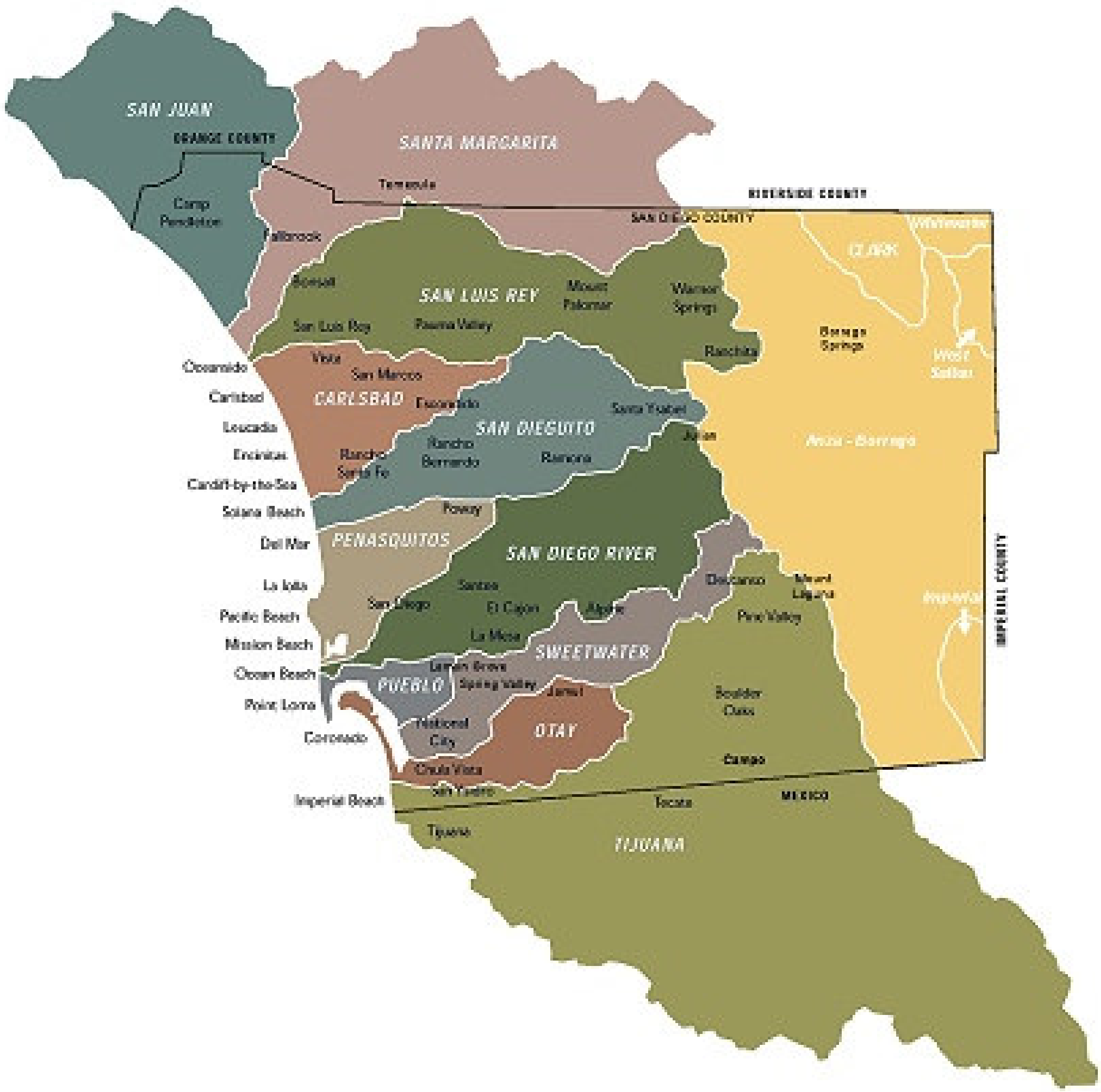

Figure 2-1. Regional Location of the Penasquitos Hydrologic Unit (Source: San Diego County Project Clean Water)

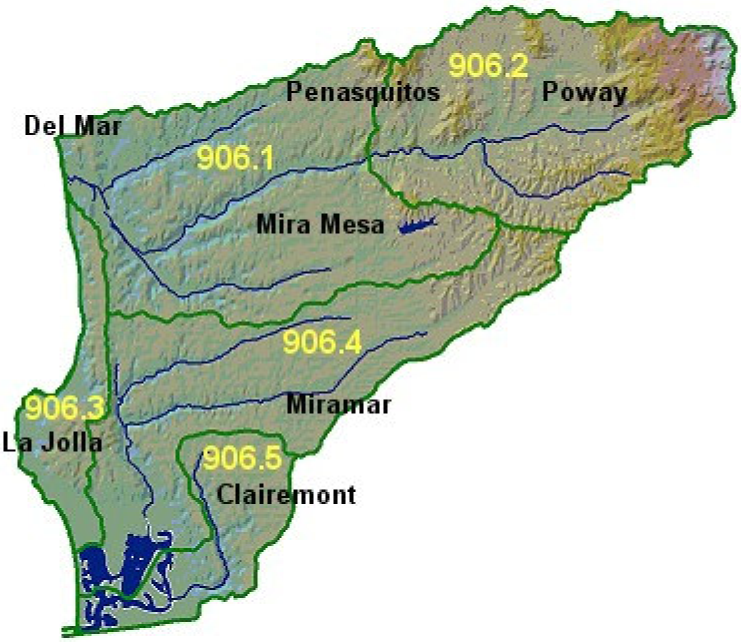

Figure 2-2. Penasquitos Hydrologic Unit (Source: San Diego County Project Clean Water)

The major receiving waters, Los Penasquitos Lagoon and Mission Bay, are both fragile systems that support diverse native fauna and flora. Both water bodies are especially sensitive to the effects of pollutants due to restricted or intermittent tidal flushing.

The Los Penasquitos Creek watershed encompasses a land area of approximately 100 square miles including portions of the cities San Diego, Poway, and Del Mar. The watershed is highly urbanized with a population of approximately 400,000 residents. The creek discharges to the 0.6 square mile Los Penasquitos Lagoon. Much of Los Penasquitos Creek is protected by the Los Penasquitos Canyon Preserve.

The Mission Bay watershed drains an area of approximately 80 square miles. Rose Creek and Tecolote Creek are the main tributaries to Mission Bay, which was converted to open water from a coastal marshland after the completion of a large dredging project in the 1940s. Major protected areas within the Mission Bay watershed include Tecolote Canyon Natural Park and Marian Bear Memorial Natural Park.

Land use within the Penasquitos HU consists of agriculture (2,139 acres), commercial (3,706 acres), industrial (5,587 acres), parks and recreation (21,851 acres), public facilities/utilities (6,716 acres), residential (31,629 acres), transportation (3,658 acres), and vacant/undeveloped (26,170 acres) (MEC, January 2005). The population within the HU is moderate for San Diego County, with an estimated 442,731 people in 1997 (SANDAG Population Estimates).

The Penasquitos HU includes the Miramar Reservoir (906.1), Poway (906.2), Scripps (906.3), Miramar (906.4), and Tecolote (906.5) Hydrologic Areas (HA). Major water bodies within the Penasquitos HU and their designated beneficial uses from the Basin Plan are provided in Table 2-1.

Table 2-1. Beneficial Uses for the Penasquitos HU

Inland Surface Waters[1,2]	Hydrologic Unit Basin Number	BENEFICIAL USE									
		MUN	AGR	IND	POW	REC1	REC2	WARM	COLD	WILD	RARE
Los Penasquitos Creek Watershed											
Los Penasquitos Lagoon[3]	6.10					•	•			•	•
Soledad Canyon	6.10	+	•	•		O	•	•	•	•	
Carroll Canyon	6.10	+	•	•		O	•	•	•	•	•
Miramar Reservoir	6.10	•		•	•	•	•	•		•	
Los Penasquitos Creek	6.20	+	•	O		•	•	•	•	•	
Rattlesnake Creek	6.20	+	•	O		•	•	•	•	•	
Poway Creek	6.20	+	•	O		•	•	•	•	•	
Beeler Creek	6.20	+	•	O		•	•	•	•	•	
Chicarita Creek	6.20	+	•	O		•	•	•	•	•	
Cypress Canyon	6.20	+	•	O		•	•	•	•	•	
Los Penasquitos Creek	6.10	+	•	•		O	•	•	•	•	
unnamed Tributary	6.10	+	•	•		O	•	•	•	•	•
Carmel Valley	6.10	+	•	•		O	•	•	•	•	
Deer Canyon	6.10	+	•	•		O	•	•	•	•	
McGonigle Canyon	6.10	+	•	•		O	•	•	•	•	
Bell Valley	6.10	+	•	•		O	•	•	•	•	
Shaw Valley	6.10	+	•	•		O	•	•	•	•	
San Diego County Coastal Streams											
unnamed intermittent coastal streams	6.30	+				O	•	•		•	
Rose Canyon Watershed											
Rose Canyon	6.40	+		O		•	•	•	•	•	
San Clemente Canyon	6.40	+		O		•	•	•	•	•	•
Tecolote Creek Watershed											
Tecolote Creek	6.50	+				O	•	•		•	
Mission Bay				•		•	•			•	•

• Existing Beneficial Use O Potential Beneficial Use + Excepted From MUN

[1] Waterbodies are listed multiple times if they cross hydrologic area or sub area boundaries.

[2] Beneficial use designations apply to all tributaries to the indicated waterbody, if not listed separately.

[3] Fishing from shore or boat permitted, but other water contact recreational (REC-1) uses are prohibited.

Other Beneficial Uses include MAR, MIGR, BIOL, EST, COMM, and SHELL.

The following beneficial use definitions are from the Basin Plan:

- **Municipal and Domestic Supply (MUN{** XE "Beneficial use definitions:MUN" **}) {** XE "Beneficial Use:Municipal and domestic supply (MUN)" **}**- Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.
- **Agricultural Supply (AGR{** XE "Beneficial use definitions:AGR **}){** XE "Beneficial use: Agricultural supply (AGR)" **}** - Includes uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
- **Industrial Service Supply (IND{** XE "Beneficial use definitions:IND" **}{** XE "Beneficial use:Industrial service supply (IND)" **})** - Includes uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.
- **Hydropower Generation (POW{** XE "Beneficial use definitions:POW" **}) {** XE "Beneficial use:Hydropower generation (POW)" **}** - Includes uses of water for hydropower generation.
- **Contact Water Recreation (REC-1{** XE "Beneficial use definitions:REC-1" **}) {** XE "Beneficial use:Contact water recreation (REC-1)" **}** - Includes uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, or use of natural hot springs.
- **Non-contact Water Recreation (REC-2{** XE "Beneficial use definitions:REC-2" **}){** XE "Beneficial use:Non-contact water recreation (REC-2)"**}** - Includes the uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
- **Warm Freshwater Habitat (WARM{** XE "Beneficial use definitions:WARM" **}) {** XE "Beneficial use:Warm freshwater habitat (WARM)" **}** - Includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.
- **Cold Freshwater Habitat (COLD{** XE "Beneficial use definitions:COLD" **}) {** XE "Beneficial use:Cold freshwater habitat (COLD)" **}** - Includes uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.
- **Wildlife Habitat (WILD{** XE "Beneficial use definitions:WILD" **}{** XE "Beneficial use:Wildlife habitat (WILD)" **})** - Includes uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
- **Rare, Threatened, or Endangered Species (RARE{** XE "Beneficial use definitions:RARE" **}) {** XE "Beneficial use:Rare, threatened, or endangered species

(RARE)" } - Includes uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened or endangered.

Section 303(d) of the federal Clean Water Act (CWA, 33 USC 1250, et seq., at 1313(d)), requires States to identify waters that do not meet water quality standards after applying certain required technology-based effluent limits ("impaired" water bodies). States are required to compile this information in a list and submit the list to USEPA for review and approval. This list is known as the Section 303(d) list of impaired waters. Impaired water bodies within the Penasquitos HU, as identified through the Clean Water Act Section 303(d) process, are provided in Table 2-2.

Table 2-2. 2002 List of Section 303(d) Impaired Waterbodies

Hydrologic Descriptor	Waterbody	Segment / Area	Pollutant / Stressor	Extent of Impairment [1.]	Year Listed
Miramar Reservoir HA (906.10)	Los Penasquitos Lagoon	Entire Lagoon	Sedimentation / Siltation	469 acres	1998
Miramar Reservoir HA (906.10)	Pacific Ocean Shoreline	Torrey Pines State Beach at Del Mar (Anderson Canyon)	Bacterial Indicators[E]	0.4 miles	2002
Scripps HA (906.30)	Pacific Ocean Shoreline	La Jolla Shores Beach at El Paseo Grande	Bacterial Indicators[E]	3.9 miles	1998
		La Jolla Shores Beach at Caminito Del Oro			
		La Jolla Shores Beach at Vallecitos			
		La Jolla Shores Beach at Ave de la Playa			
		Casa Beach, Children's Pool			
		South Casa Beach at Coast Blvd.			
		Whispering Sands Beach at Ravina St.			
		Windansea Beach at Vista de la Playa			
		Windansea Beach at Bonair St.			
		Windansea Beach at Playa del Norte			
		Windansea Beach at Palomar Ave.			
		Tourmaline Surf Park			
		Pacific Beach at Grand Ave.			
Miramar HA (906.40)	Mission Bay Shoreline	Entire bay shoreline	Bacterial Indicators	1540 acres	1998
		Rose and Tecolote Creek Mouths	Eutrophic	0.5 acre	1998
		Rose and Tecolote Creek Mouths	Lead	0.5 acre	1998

Tecolote HA (906.50)	Tecolote Creek	Bacterial Indicators	6.6 miles	1998
		Cadmium		
		Copper		
		Lead		
		Toxicity		
		Zinc		
[1] In 1998, unless more information was available, the extent of impairment was assumed to be 0.1 miles for each shoreline impairment due to bacteria. In 2002, the extents of impairment were increased to 0.4 miles. Extents of impairment that were greater than 0.4 miles in 1998 were not changed.				

Other serious water quality concerns in the watershed include excessive sedimentation from development, habitat loss, the introduction of exotic species, and channelization. During the development of the 2002 303(d) list, constituents of potential concern were also identified as provided in Table 2-3.

Table 2-3. Constituents of Potential Concern Within the Penasquitos HU

Waterbody	Constituent of Potential Concern
Miramar Reservoir	Bromodichloromethane Total Dissolved Solids
Mission Bay	*Caulerpa taxifolia* Copper (at Quivera Basin)
Rose Creek	Sedimentation / Siltation
TecoloteCreek	Sedimentation / Siltation

2.1.1 MAIN WATERBODIES WITHIN THE HU[1]

Los Penasquitos Creek

The Los Penasquitos Creek flows through the entire length of the Los Penasquitos Canyon. Beginning at the eastern end of the creek, there are three main drainages, Beeler Canyon, Rattlesnake Creek, and Poway Creek, that initiate the flow. The three main tributaries to Los Penasquitos Creek begin east of the City of Poway in an area that is characterized by vacant and undeveloped land along with single family residential and public services. Rattlesnake Creek and Poway Creek join at the Poway Community Park to form Los Penasquitos Creek. Beeler Creek joins a little farther downstream. Los Penasquitos Creek then flows west and collects water from Sabre Springs, Chicaarita Creek, Los Penasquitos Preserve, Lopez Creek, and adjacent tributary canyons. Once the

[1] The material in Section 2.1.1 is adapted from the *Penasquitos Watershed Urban Rinoff Management Plan* and *Mission Bay and Coastal La Jolla Watersheds Urban Runoff Management Plan* dated January 2003 and prepared by the Cities of San Diego, Del Mar, Poway, and the County of San Diego.

creek crosses under Interstate 15, it flows through the Los Penasquitos Preserve which collects water from residential areas and vacant land. The creek continues to flow through a combination of residential, business, and light industrial land uses until it enters Los Penasquitos Lagoon. The creek has been channelized in several sections to accommodate development and two stretches in the lower portion have been lined with concrete.

Carroll Creek

Carroll Creek flows westward through the Carroll Canyon sub-basin along the southern edge of the watershed. The headwaters of the creek are located near the Miramar Reservoir. The creek flows through areas of heavy industrial uses, undeveloped areas, and parks until it reaches Interstate 805. After crossing under Interstate 805, the creek is called Soldedad Canyon Creek or sometime Sorrento Valley Creek. Soledad Canyon Creek then flows in a northwesterly direction under Interstate 5 and joins Los Penasquitos Creek in Sorrento Valley before flowing into Los Penasquitos Lagoon.

Carmel Creek

Carmel Creek flows westward through the Carmel Valley sub-basin located within the northwestern portion of the watershed. The two main tributaries to Carmel Creek are McGonigle Creek and Deer Creek. The headwaters are located in Black Mountain Park and an agricultural area near Black Mountain. This area of the watershed is undergoing rapid conversion from agricultural land uses to primarily residential land uses. State Route 56 within the watershed has recently been completed and now connects Interstate 5 and 15. This creek terminates at Los Penasquitos Lagoon. Because of the increase in freshwater flows and increased sedimentation due to urbanization, the salt marsh that previously existed at the terminus of Carmel Creek has been converted to freshwater marsh and riparian habitat.

Los Penasquitos Lagoon

Los Penasquitos Lagoon was historically a tidal estuary, but is now primarily closed to tidal flushing. Construction of a railroad embankment, Interstate 5, Pacific Coast Highway, and North Torrey Pines Road and increased sedimentation due to urbanization have contributed to inlet closures. The lagoon inlet is periodically opened by mechanical means when water quality degrades to the point that there are observable, or pending, fish kills.

Rose Creek

Rose Creek flows from the east then turns south where San Clemente Creek enters and continues flowing south into Mission Bay. The headwaters of the watershed are on the Marine Corps Air Station at Miramar where land use is mainly undeveloped, parks, and public facilities. Down stream of the air station, Rose Creek and San Clemente Creek flow into the Rose Canyon Open Space and Marian Bear Memorial Natural Park until shortly downstream of State Route 52. Land use within the watershed, outside of the air station, is mainly residential with some commercial and industrial.

Tecolote Creek

Tecolote Creek flows generally south and then turns west to flow under Interstate 5 and enter Mission Bay. Land use within the watershed is mainly residential and commercial with the creek itself flowing through the relatively undisturbed Tecolote Canyon Natural Park. The watershed is built-out, but some redevelopment is occurring.

Mission Bay

The 4,600 acre Mission Bay Park is the result of historical dredging of coastal salt marsh and mudflats in the 1940s. Mission Bay receives runoff from approximately 56 square miles of urbanized areas drainaed by Tecolote and Rose Creeks. Over 80 storm drains also discharge to the bay. Mission Bay Park is the largest aquatic park along the western coast of the United States and offers a wide range of contact and non-contact recreational activities.

2.2. MONITORING WITHIN THE PENASQUITOS HU

The Municipal Separate Storm Sewer System (MS4) permit for the County of San Diego (County), incorporated cities within the County, San Diego Unified Port District, and San Diego Airport Authority requires the copermittees to conduct receiving water monitoring. Various versions of the monitoring program have been in effect since 1993. The program has evolved through time to include more sample sites and programs. Monitoring requirements include chemical and toxicity testing of runoff from long-term mass loading stations, rapid stream bioassessments, ambient bay and lagoon monitoring, and dry weather and coastal outfall sampling. A chronology of the evolution of the monitoring program, as well as specific methodologies and results for the Penasquitos HU, can be found in the *San Diego County Municipal Copermittees 2003-2004 Urban Runoff Monitoring Final Report* (MEC; January 2005). A summary of the 2003-2004 monitoring results is provided in Section 4.0.

In 1997 and 1999, the RWQCB(9) contracted DFG's Aquatic Bioassessment Laboratory (ABL) to help them incorporate bioassessment into their ambient water quality monitoring program. Bioassessment sampling was conducted in May 1998, September 1998, November 1998, and May 1999 at 48 locations spread throughout the San Diego Region. A second round of bioassessment sampling was conducted in November 1999, May 2000, and November 2000. In May 2001, a third round of sampling was conducted increasing the number of sampling sites to 93 locations. A summary of the results of this bioassessment sampling is provided in Section 4.0.

Where appropriate, and when additional SWAMP resources are available, quantitative water quality data from copermittee monitoring and other monitoring will be identified and integrated with the SWAMP data to allow for a more comprehensive assessment of water quality within the Penasquitos HU.

2.3. STAKEHOLDER ACTIVITIES WITHIN THE PENASQUITOS HU

Stakeholders within the Penasquitos HU are also conducting studies and developing plans that address water quality and beneficial uses. Brief summaries of some of these efforts are provided below.

Los Penasquitos Watershed Management Plan. Development of this plan was funded, in part, by the State Water Resources Control Board (SWRCB) Costa-Machado Water Act of 2000 (Proposition 13) and was lead by the City of San Diego. The plan was developed to provide an assessment of the watershed resources, understand how threats or stressors affect the resources, and to develop a comprehensive plan for managing the resources and beneficial uses of the watershed. The plan address a portion of the Penasquitos HU, including the Miramar Reservoir HA, and the Poway HA. The plan does not include the Scripps HA, Miramar HA, and Tecolote HA.

Penasquitos and Mission Bay Watershed Urban Runoff Management Programs (WURMP). The San Diego MS4 permit has split the Penasquitos HU into two watersheds: Penasquitos and Mission Bay. The City of San Diego, in conjunction with the Cities of Del Mar and Poway and the County of San Diego, have prepared a WURMP for the Penasquitos Watershed in accordance with the MS4 permit; the City of San Diego has also prepared a WURMP for Mission Bay. The WURMPs recognize that pollutants do not observe jurisdictional boundaries and require collaboration among copermittees to address common pollutants. The copermittees are required to identify and prioritize major water quality problems and their likely sources, and implement short- and long-term activities that address high priority water quality problems.

The 2003-2004 Penasquitos WURMP identified sedimentation/siltation and bacterial indicators as high priority water quality problems. The 2003-2004 Mission Bay WURMP identified bacterial indicators as the high priority water quality problem.

Los Peñasquitos Sediment Retention Project The Los Penasquitos Lagoon Foundation has received two grants from the Proposition 13 grant program to reduce sedimenation of the lagoon. The grants plan to study the watershed, design basins, and construct basins on two of the three major creeks which input to the lagoon. Additional erosion control devices will also be installed. A citizen monitoring program is also planned. The grants are due to be complete by March 1, 2006.

Mission Bay Special Studies. Numerous grants and special studies have recently been implemented to address water quality issues in the Mission Bay watershed. Projects include:

- Bacteria source identification project;
- Centralized computer irrigation system;

- Water quality survey;
- Epidemiology study;
- Rose and Tecolote Creeks water quality improvement projects;
- Mission Bay low flow storm drain diversion system;
- Coastal low flow storm drain diversion project; and
- Rose Creek watershed opportunities assessment.

Where appropriate, and when additional SWAMP resources are available, quantitative water quality data from stakeholder activities will be integrated with the SWAMP data to allow for a more comprehensive assessment of water quality within the Penasquitos HU.

3.0 SURFACE WATER AMBIENT MONITORING PROGRAM (SWAMP)

3.1. SWAMP PURPOSE AND OBJECTIVES

Originally, SWAMP monitoring in the San Diego region was intended to provide reliable, high quality information necessary to produce water quality assessment [305(b)] and impaired waters [303(d)] lists that are more comprehensive and more defensible than those of past years. The primary objectives for SWAMP monitoring in the San Diego region were those identified as numbers 9, 10, and 11 in the "Site Specific Monitoring" section of the SWRCB Report to the Legislature contained in Table 3-1. These objectives are related to the question of whether aquatic populations, communities, and habitats are protected.

Table 3-1. Primary Objectives for SWAMP Monitoring

Number	Primary Objectives for SWAMP Monitoring
9	At sites influenced by point sources (e.g., storm drains, publicly owned treatment works, etc.) or nonpoint sources of pollutants, identify specific locations of degraded water or sediments in rivers, lakes, nearshore waters, enclosed bays, or estuaries using several critical threshold values of toxicity, water column or epibenthic community analysis, habitat condition, and chemical concentration.
10	At sites influenced by point sources (e.g., storm drains, publicly owned treatment works, etc.) or nonpoint sources of pollutants, identify specific locations of degraded sediment in rivers, lakes, nearshore waters, enclosed bays, or estuaries using several critical threshold values of toxicity, water column or epibenthic community analysis, habitat condition, and chemical concentration.
11	Identify the areal extent of degraded sediment locations in rivers, lakes, nearshore waters, enclosed bays, and estuaries using several critical threshold values of toxicity, benthic community analysis, habitat condition, and chemical concentration.

Over time, the goals and objectives of the SWAMP program within the San Diego region have evolved. Originally and primarily, the San Diego region intended to use SWAMP data in support of Clean Water Act sections 303(d) and 305(b) assessments. While available resources and delays in obtaining useable SWAMP data precludes the use of SWAMP data in 303(d) and 305(b) assessments, some knowledge of ambient conditions is still obtained. SWAMP data should be used to initiate or support site-specific actions. These include traditional enforcement and the issuance of requests for more information under the authority of Porter Cologne.

Secondarily, SWAMP should serve as the framework to establish comprehensive regional ambient monitoring. Through the increased internal organization and the development of partnerships with stakeholders, SWAMP can coordinate available regional resources to truly characterize ambient conditions throughout the region. The data would then allow the identification of trends in water quality and beneficial uses, support development of regional nutrient criteria, and further support the refinement of the Index of Biotic Integrity (IBI). Public and stakeholder education and fostering increased stewardship of our waters are additional goals and objectives.

3.2. Sample Collection and Methodology

SWAMP samples were collected and analyzed in accordance with the Fiscal Year 2000-2001 Work Plan. Samples were collected at five locations as shown on Figure 3-1. Poway Creek is the farthest upstream sample location. Los Penasquitos Creek, Soledad Canyon Creek, Rose Canyon Creek, and Tecolote Creek are downstream locations. Cruise reports that describe sampling activities are provided in Appendix A.

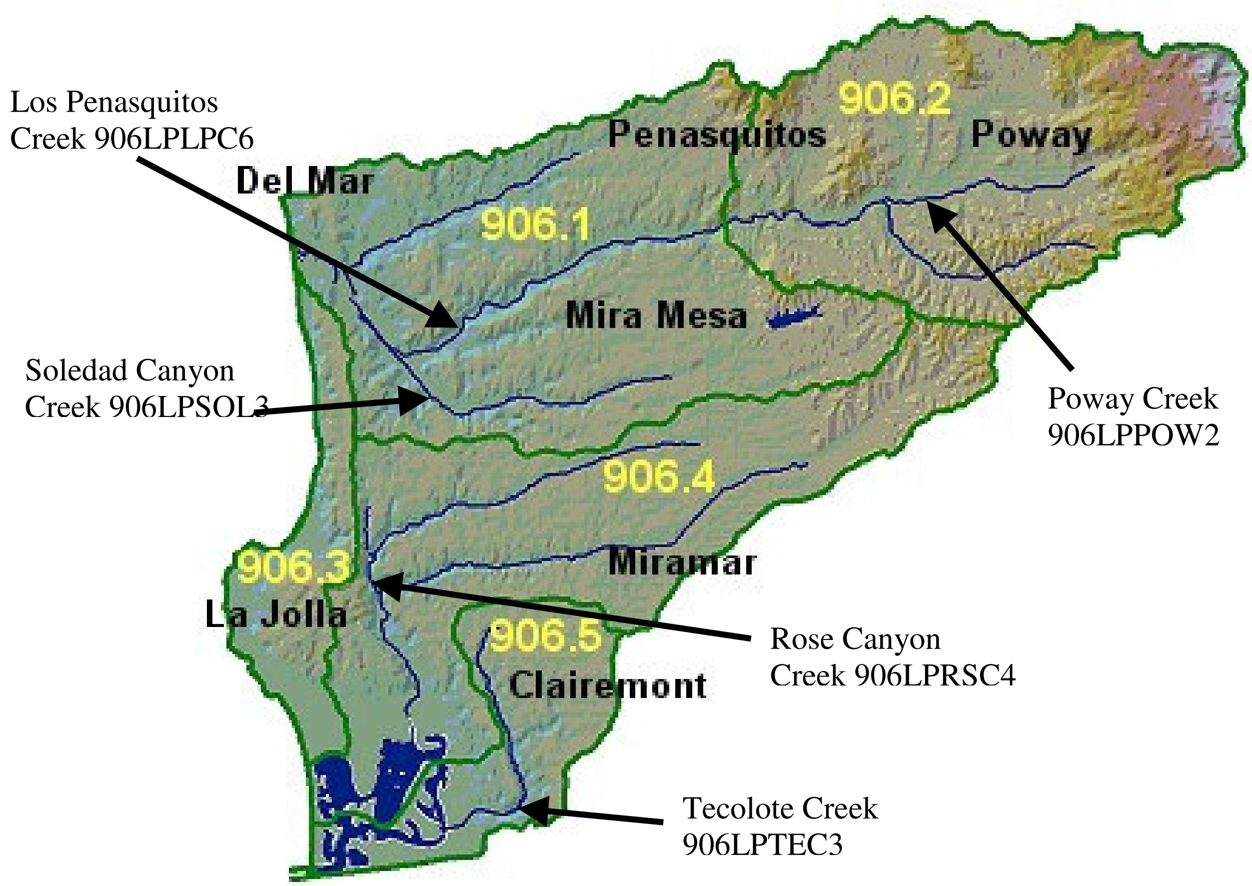

Figure 3-1. SWAMP Sampling Locations Within the Penasquitos HU (Source: San Diego County Project Clean Water with sample locations added)

Water and sediment samples were collected at all sample locations. Fish tissue samples were collected at two locations. Water samples were analyzed for physical parameters, water chemistry, and water toxicity. Sediment samples were only analyzed for toxicity. Toxicity testing provides for a quantification of water or sediment quality and incorporates the effects and bioavailability of all constituents including constituents not directly quantified. Toxicity tests can also evaluate synergy between multiple constituents causing toxicity above what would be predicted by the individual chemical concentrations. For water toxicity, the test organisms were *Ceriodaphnia dubia* (water flea) and *Selenastrum capricornutum* (algae). For sediment toxicity, the test organism was *Hyalella azteca* (amphipod). Sampling activities including locations, dates, and type of monitoring are summarized in Table 3-2 and 3-3. Laboratory methods, method detection limits, and reporting limits are included in Appendix B. Quality Assurance and Quality Control sample data are evaluated and discussed in Appendix C.

The *Ceriodaphnia dubia* 7-Day Chronic Toxicity Test was conducted on all water samples. In this procedure, water samples collected from field stations are divided into replicate beakers in the laboratory. Single *Ceriodaphnia* neonates are placed into each replicate container and monitored for mortality and fecundity. After a 7-day exposure, daily survival and reproduction are used to give an estimate of sample toxicity. Because this test measures the effects on an early life-stage of an ecologically important species possessing relatively stringent water quality requirements, the results constitute a good evaluation of water quality.

The *Selenastrum capricornutum* 96-hour Chronic Toxicity Test was conducted on all water samples. In this procedure, water samples collected from field stations are divided into replicate flasks in the laboratory. A known cell density of *Selenastrum* is placed into each replicate container and monitored for growth. Because the test measures effects on an early life-stage of an ecologically important species possessing relatively stringent water quality requirements, the results constitute a good evaluation of water quality.

The Amphipod *Hyalella azteca* Sediment Toxicity Test was conducted on all sediment samples. In this procedure, sediment collected from field stations is divided into randomly numbered replicate test containers in the laboratory and covered with dilution water (US EPA 2000). Ten amphipods are placed into each replicate container and allowed to interact with the test sediments. After a 10-day exposure, the sediment is sieved to recover the amphipods, and live animals are counted to determine the percentage that survived the exposure. Animals from each replicate are then dried and weighed. Sediment toxicity is characterized by the mean percent survival and growth (± standard deviation) for each sediment sample. This can be compared to the survival and growth observed in sediment from the amphipod collection site (home sediment), or in sediment from reference sites presumed to have similar natural characteristics but low contaminant concentrations (Kemble *et al.* 1994).

Table 3-2. SWAMP Sampling Activities Within the Penasquitos HU

Location/ Station No.	Latitude	Longitude	Sample Dates	Physical Parameters[1]	Water Chemistry[2]	Water Toxicity	Sediment Toxicity	Fish Tissue
Los Penasquitos Creek 906LPLPC6	32.90588	-117.22703	3/13/2002	Y	Y	Y	Y	
			4/24/2002	Y	Y	Y	Y	
			6/5/2002	Y	Y	Y	Y	Y-6/3/02
			9/18/2002	Y	Y	Y	Y	
Soledad Canyon Crk. 906LPLSOL2	32.89120	-117.21300	3/13/2002	Y	Y	Y	Y	
			4/24/2002	Y	Y	Y	Y	
			6/5/2002	Y	Y	Y	Y	
			9/18/2002	Y	Y	Y	Y	
Rose Canyon Creek 906LPRSC4	32.83703	-117.23178	3/13/2002	Y	Y	Y	N	
			4/24/2002	Y	Y	Y	Y	
			6/5/2002	Y	Y	Y	Y	Y-6/3/02
			9/18/2002	Y	Y	Y	N	
Poway Creek 906LPPOW2	32.95173	-117.04766	3/14/2002	Y	Y	Y	Y	
			4/24/2002	Y	Y	Y	Y	
			6/5/2002	Y	Y	Y	Y	
			9/18/2002	Y	Y	Y	Y	
Tecolote Creek 906LPTEC3	32.77633	-117.18608	3/14/2002	Y	Y	Y	N	
			4/24/2002	Y	Y	Y	Y	
			6/5/2002	Y	Y	Y	Y	
			9/18/2002	N	N	N	N	

1. Includes saturated oxygen, temperature, conductivity, turbidity, pH, and centroid velocity.
2. Includes inorganics, dissolved metals, OP pesticides, OC pesticides, PCBs, PAHs, and Trianzine Herbicides.

Table 3-3. SWAMP Sampling Analytes Within the Penasquitos HU

Physical Parameters	**Inorganics (water samples)**	**Metals dissolved (water sample)**	**OP Pesticides (water sample)**	**OC Pesticides (water sample)**	**PCBs (water sample)**
Stream velocity dissolved oxygen pH temperature conductivity turbidity **Trianzine Herbicides (water sample)** Ametryn Atraton Atrazine Prometon Prometryn Propazine Secbumeton Simazine Simetryn Terbuthylazine Terbutryn	Alkalinity as $CaCO_3$ Ammonia as N Nitrate & Nitrite as N Nitrogen as Total Kjeldahl OrthoPhosphate as P Total Phosphorus as P Sulfate **PAHs (water sample)** Acenaphthene Acenaphthylene Anthracene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(e)pyrene Benzo(g,h,i)perylene Benzo(k)fluoranthene Biphenyl Chrysene Dibenz(a,h)anthracene Dimethylnaphthalene, 2,6- Fluoranthene Fluorene Indeno(1,2,3-c,d)pyrene Methylnaphthalene, 1- Methylnaphthalene, 2- Naphthalene Perylene Phenanthrene Phenanthrene/Anthracene, C1 - Pyrene Trimethylnaphthalene, 2,3,5- **Toxicity (water sample)** *Ceriodaphnia dubia* *Selenastrum capricornutum* **Toxicity (sediment sample)** *Hyalella azteca*	Aluminum Arsenic Cadmium Chromium Copper Lead Manganese Nickel Selenium Silver Zinc **Fish Tissue** at station <u>906LPLPC6</u> 49 crayfish at station <u>906LPRSC4</u> 40 crayfish	Aspon Azinphos ethyl Azinphos methyl Bolstar Carbophenothion Chlorfenvinphos Chlorpyrifos Chlorpyrifos methyl Ciodrin(Crotoxyphos) Coumaphos Demeton-s Diazinon Dichlofenthion Dichlorvos Dicrotophos Dimethoate Dioxathion Disulfoton Ethion Ethoprop Famphur Fenchlorphos Fenitrothion Fensulfothion Fenthion Fonofos (Dyfonate) Leptophos Malathion Merphos Methidathion Mevinphos Molinate Naled(Dibrom) Parathion, Ethyl Parathion, Methyl Phorate Phosmet Phosphamidon Sulfotep Terbufos Tetrachlorvinphos Thiobencarb Thionazin Tokuthion Trichlorfon Trichloronate Triphenyl phosphate (Surrogate)	Aldrin Chlordane, cis Chlordane, trans Chlordene, alpha Chlordene, gamma Dacthal DDD(o,p') DDD(p,p') DDE(o,p') DDE(p,p') DDMU(p,p') DDT(o,p') DDT(p,p') Dieldrin Endosulfan I Endosulfan II Endosulfan sulfate Endrin Endrin Aldehyde Endrin Ketone HCH, alpha HCH, beta HCH, delta HCH, gamma Heptachlor Heptachlor epoxide Methoxychlor Mirex Nonachlor, cis Nonachlor, trans Oxadiazon Oxychlordane Tedion	PCB 005 PCB 008 PCB 015 PCB 018 PCB 027 PCB 028 PCB 029 PCB 031 PCB 033 PCB 044 PCB 049 PCB 052 PCB 056 PCB 060 PCB 066 PCB 070 PCB 074 PCB 087 PCB 095 PCB 097 PCB 099 PCB 101 PCB 105 PCB 110 PCB 114 PCB 118 PCB 128 PCB 137 PCB 138 PCB 141 PCB 149 PCB 151 PCB 153 PCB 156 PCB 157 PCB 158 PCB 170 PCB 174 PCB 177 PCB 180 PCB 183 PCB 187 PCB 189 PCB 194 PCB 195 PCB 200 PCB 201 PCB 203 PCB 206

3.3. Threshold Values

Threshold values are used to determine constituent concentrations or toxicity values which are elevated, or biologic assessment data or fish tissue data which indicate an impairment. Exceedance of a threshold value does not necessarily equate to exceedance of a regulatory value; rather the values are used for comparison purposes. Threshold values have been determined from a variety of sources including:

- *Water Quality Control Plan for the San Diego Basin (9)* (Basin Plan);
- Code of Federal Regulations Title 40 part 131 Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California (CTR);
- Maximum Contaminant Levels established in the California Code of Regulations
- Total Maximum Daily Load (TMDL;)
- US Environmental Protection Agency (USEPA) National aquatic life criteria;
- Method Detection Limit (MDL) or Reporting Limit (RL); and
- Statistical Methodologies.

3.3.1. Chemical Data Threshold Values

Threshold values for most constituents are based upon the *Water Quality Control Plan for the San Diego Basin (9)* (Basin Plan), which contains numerical and narrative water quality objectives for all inland surface waters and coastal lagoons within the Penasquitos HU. Many numerical objectives are contained in Table 3-2 of the Basin Plan. The lowest applicable objective or criteria is used as the threshold value for each constituent. The threshold values for chemical data are shown in Table 3-3 for each constituent which was detected.

The Basin Plan incorporates by reference the maximum contaminant levels (MCL) specified in California Code of Regulations (CCR), Title 22, Table 64444-A of section 6444 (Organic Chemicals), Table 64431-A of section 64431 (Inorganic Chemicals), Table 64449-A (Secondary Maximum Contaminant Levels, Consumer Acceptance Limits) for all surface water in the watershed that are designated for use as domestic or municipal supply (MUN). A threshold value of 1.6 milisiemens/centimeter is used for specific conductance from Table 64449-B of section 64449 of CCR (Secondary Maximum Contaminant Levels – Ranges). Although most waters in the Penasquitos HU are not designated MUN, the MCLs are used as threshold values where no other value is available.

The Basin Plan also incorporates by reference for all inland surface waters and coastal estuaries, the numerical objectives for toxic pollutants applicable to California as specified in 40 CFR 131.36 (§131.36 revised at 57 FR 60848, December 22, 1992) (National Toxics Rule) (NTR). Only certain specified critieria in the NTR are applicable to California waters.

Although not specifically incorporated into the Basin Plan, applicable numerical objectives are established in 40 CFR 131.38 (§131.38 revised at 65 FR 31682, May 18, 2000) (California Toxics Rule) (CTR). The CTR table in 40 CFR 131.38 (b)(1) contains the original NTR criteria and the new CTR criteria in the same table.

Criteria from USEPA's National Recommended Water Quality Criteria to protect Freshwater Aquatic Life were used as threshold values for alkalinity, ammonia, and selenium in the absence of other applicable criteria. The CTR contains criteria for selenium, but it is not applicable in San Diego region. The chronic CTR selenium limit is the same as the chronic USEPA criteria.

The threshold value for OP Pesticides, OC Pesticides, Trianzine Herbicides, PAHs, and PCBs is the method detection limit (MDL). In cases where the result was below the MDL, the reporting limits are used as threshold values. No threshold value is used if proper quality assurance/ quality control procedures were not documented by the laboratory.

The following Basin Plan objectives were also considered in determining threshold values:

- *The discharge of wastes shall not cause concentrations of un-ionized ammonia (NH3) to exceed 0.025 mg/l (as N) in inland surface waters, enclosed bays and estuaries and coastal lagoons.*

- *Inland surface waters, bays and estuaries and coastal lagoon waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses.*

- *Concentrations of nitrogen and phosphorus, by themselves or in combination with other nutrients, shall be maintained at levels below those which stimulate algae and emergent plant growth. Threshold total phosphorus (P) concentrations shall not exceed 0.05 mg/l in any stream at the point where it enters any standing body of water, nor 0.025 mg/l in any standing body of water. A desired goal in order to prevent plant nuisance in streams and other flowing waters appears to be 0.1 mg/l total P. These values are not to be exceeded more than 10% of the time unless studies of the specific water body in question clearly show that water quality objective changes are permissible and changes are approved by the Regional Board. Analogous threshold values have not been set for nitrogen compounds; however, natural ratios of nitrogen to phosphorus are to be determined by surveillance and monitoring and upheld. If data are lacking, a ratio of N:P = 10:1 , on a weight to weight basis shall be used.*

- *Dissolved oxygen levels shall not be less than 5.0 mg/l in inland surface waters with designated MAR or WARM beneficial uses or less than 6.0 mg/l in waters with designated COLD beneficial uses. The annual mean dissolved oxygen concentration shall not be less than 7 mg/l more than 10% of the time.*

- *In inland surface waters the pH shall not be depressed below 6.5 nor raised above 8.5.*

- *All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration, or other appropriate methods as specified by the Regional Board.*

3.3.2. TOXICITY DATA THRESHOLD VALUES

A Toxicity Significant Effect Code is used as the threshold value for toxicity. The Toxicity Significant Effect Code indicates if an environmental sample is significantly different from its associated control sample. The code is reported in two parts because the lab uses two criteria to determine significance. The first part of the code refers to the probability value, calculated using the paired T-test statistical method, which is significant if alpha is less than 5%. A paired T-test statistical evaluation is performed to determine if the sample result is significantly different from the negative control. For the first part of the code, **S** is used when the sample is significantly different from the negative control and **NS** is used when the sample is not significantly different. Also for the first part of the code, **SR** is used when the sample is significantly different from the reference, but not compared to negative control and **NSR** is used when the sample is not significantly different from the reference.

The second part of the code relates to a comparison of the sample result to the 80% evaluation threshold which is calculated as 80% of the negative control result. **L** is used when the sample is less than the 80% evaluation threshold and **G** is used when the sample is greater than the 80% evaluation threshold. Table 3-4 below describes the Toxic Significant Effects Codes.

The code **SL** indicates that the sample shows effects of toxicity. The code **NSG** indicates that the sample shows no effects of toxicity. Other code combinations indicate that the test for toxicity was inconclusive.

Table 3-4. Toxicity Significant Effect Codes

Code	Description
NSL	Not significant compared to negative control based on statistical test, alpha greater than 5%, but was less than the evaluation threshold (Second criteria met)
SG	Significant compared to negative control based on statistical test, alpha less than 5%, BUT is greater than the evaluation threshold (Only the first criteria met)

Code	Description
NSG	Not significant compared to negative control based on statistical test, alpha of 5%, and is above the evaluation threshold (No criteria met)
SL	Significant compared to negative control based on statistical test, alpha of less than 5%, AND less than the evaluation threshold (Both toxicity criteria met)

3.3.3. INDEX OF BIOTIC INTEGRITY (IBI) (TO BE DEVELOPED)

3.3.4. FISH TISSUE THRESHOLD VALUES (TO BE DEVELOPED)

3.4. DATA ANALYSIS METHODOLOGY

Ultimately, three types of data will be assessed to evaluate the extent of pollution in receiving waters monitored by the SWAMP program. This evaluation method is called the Triad Approach. Currently, the chemistry and toxicity data are available and have been assessed. The bioassessment data, including fish tissue data, are not yet available. The following paragraphs describe how the assessment will be conducted once all the data are available. The current assessment follows this methodology, but only for the chemistry and toxicity data.

Results from the three types of monitoring will be assessed to evaluate the extent and causes of pollution in receiving waters and to prioritize management actions to eliminate or reduce the sources. The framework provided in Table 3-5 below was used to determine conclusions from the data and appropriate follow-up actions. The framework in Table 3-5 was derived from the *Model Monitoring Program for Municipal Separate Storm Sewer Systems in Southern California* (SMC, 2004).

The data are first assessed based on the framework in Table 3-5. When this data assessment indicates the presence of toxic pollutants, conducting a Toxicity Identification Evaluation (TIE) is recommended. A TIE is a set of procedures used to identify the specific chemical(s) responsible for toxicity to aquatic organisms. When water samples are toxic to a test organism, a TIE must be conducted to confirm potential constituents of concern and rule out others, therefore allowing the prioritization of appropriate management actions. If a sample is toxic to more than one species, it is necessary to determine the toxicant(s) affecting each species. If the type and source of pollutants can be identified based on the data alone and an analysis of potential sources in the drainage area, a TIE is not necessary.

When a TIE identifies a pollutant as a cause of toxicity, it will then be necessary to conduct a toxicity reduction evaluation (TRE). A TRE is a study conducted in a step-wise process to identify the causative agents of toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. A TRE should include an analysis and discussion of all potential source(s) causing toxicity, proposed BMPs to eliminate or reduce the pollutants causing toxicity, and suggested follow-up monitoring to demonstrate that toxicity has been removed.

Table 3-5. Triad Approach to Determining Follow-up Actions

	Chemistry	Toxicity	Bioassessment	Possible Conclusion Determining Action	Action
1.	Persistent[2] exceedance of water quality objectives	Evidence of toxicity[3]	Indications of benthic alteration[4]	Strong evidence of pollution-induced degradation	Conduct TIE to identify contaminants of concern, based on TIE metric, initiate TRE
2.	No persistent exceedances of water quality objectives	No evidence of toxicity	No indications of benthic alteration	No evidence of pollutant-induced degradation	No action necessary
3.	Persistent exceedance of water quality objectives	No evidence of toxicity	No indications of benthic alteration	Contaminants are present but not bioavailable	Assess possible upstream sources of pollutants causing exceedances
4.	No persistent exceedances of water quality objectives	Evidence of toxicity	No indications of benthic alteration	Unmeasured contaminants exist with the potential to cause degradation to aquatic life	Conduct TIE to identify contaminants of concern, based on TIE metric, initiate TRE
5.	No persistent exceedances of water quality objectives	No evidence of toxicity	Indications of benthic alteration	Alteration probably not due to toxic pollutants	No action necessary due to toxic chemicals Initiate TRE for physical sources of benthic alteration
6.	Persistent exceedance of water quality objective	Evidence of toxicity	No indications of benthic alteration	Toxic contaminants are bioavailable, but in situ effects are not demonstrable	If chemical and toxicity tests indicate persistent degradation, conduct TIE to identify contaminants of concern, based on TIE metric, initiate TRE

[2] Persistent exceedance shall mean the exceedance of relevant Basin Plan or CTR objectives by 20% for three sampling events.
[3] Evidence of persistent toxicity shall mean a Toxicity Significant Effect Code of **SL** for two or more samples in a toxic endpoint.
[4] Indications of benthic alteration shall mean an IBI score of Fair, Poor, or Very Poor.

In addition to applying the Triad Approach to determine follow-up actions, rainfall data are also evaluated. Rainfall data at Miramar Air Station from the National Weather Service web site is plotted in Figure 3-2 for the period from September 1, 2001 through December 31, 2002. The 2001/02 rainy season had very low rainfall totals. A total of 2.38 inches of rain fell for the 2001/02 rainy season. The annual average rainfall at Miramar Air Station is 10.65 inches. Only 1.56 inches of rain had fallen by the March 13, 2002 sampling event and an additional 0.62 inches of rain fell by the April 24, 2002 sample event for a total of 2.18 inches season to date. Rainfall (0.16 inches) occurred during the April 24, 2002 sampling date, making these the only samples collected during a storm.

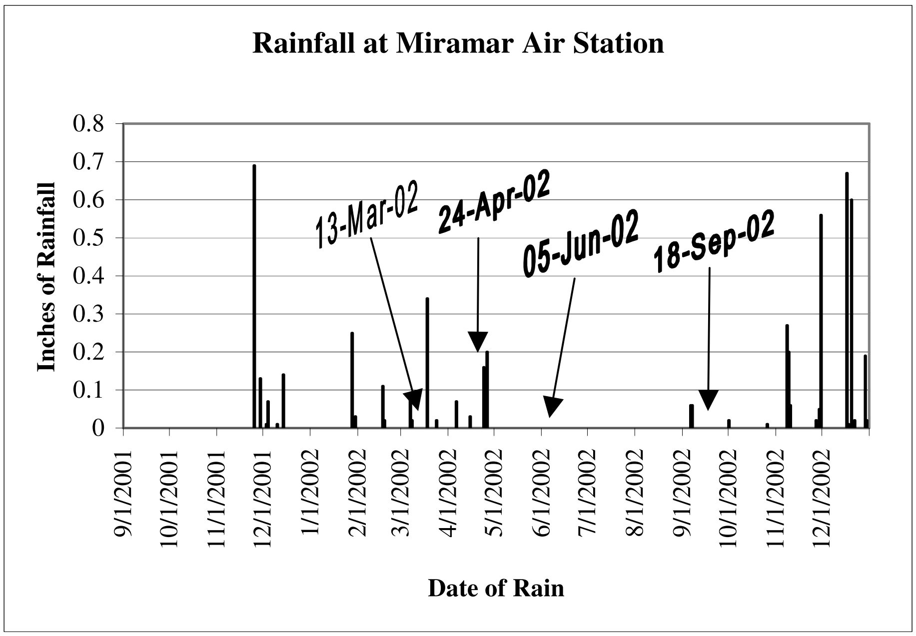

Figure 3-2. Rainfall Amounts at Miramar Air Station

3.5. RESULTS AND DATA ANALYSIS

Sample results are summarized for each watershed in the sections below in a narrative form followed by tabular form. Each table includes constituents, sample date, results, and threshold values. Results for all field measurements, inorganics, and dissolved metals are included in the tables. For OP pesticides, OC pesticides, Trianzine herbicides, PCBs, and PAHs, results are only shown in the table for constituents which were detected. Results for all toxicity data are also summarized in tables.

3.5.1. LOS PENASQUITOS CREEK (906LPLC6)

Station 906LPLC6 on Los Penasquitos Creek is located in HA 906.10, upstream of the Interstate 5 and 805 bridge and downstream of the bridge at Vista Sorrento Parkway. The photo in Figure 3-3 shows the sample location.

Figure 3-3. Los Penasquitos Creek Sample Location

Physical Parameters: One sample had an elevated pH of 8.67; this is above the Basin Plan objective of 8.5. Three samples exceeded the specific conductance threshold value by more than 20% which meets the definition of persistently exceeded.

Inorganics: Three samples exceeded the sulfate Basin Plan objective by more than 20%, meeting the definition of persistently exceeded, and one sample was below the sulfate Basin Plan objective. The April 24, 2002, sample exceeded the total nitrogen water quality objective for flowing water of 1.0 mg/L. Two samples, collected on April 24 and June 5, 2002, exceeded the total phosphorus water quality objective for flowing water of 0.1 mg/l.

Metals: The chronic water quality criteria from the CTR for selenium of 5 µg/L was exceeded in three of four samples.

PAH and PCB: Naphthalene was detected at 0.035 µg/L which was a calculated value 1/2 distance between MDL and RL.

Pesticides and Herbicides: Diazinon was detected in all four samples and one sample exceeded both the acute and chronic criteria. Disulfoton, oxadiazon, secbumeton, and terbuthylazine were detected in three samples. Dimethoate, naled(dibrom), and atrazine were detected in two samples. Azinphos methyl, carbophenothion, dicrotophos, dioxathion, ethoprop, malathion, mevinphos, molinate, methyl parathion, thiobencarb, dacthal, DDD(p,p'), DDE(p,p'), endrin aldehyde, methoxychlor, and propazine were detected in one sample.

Toxicity: Persistent toxicity was noted for the *Selenastrum capricornutum*. There was no significant toxicity for the *Ceriodaphnia dubia* percent survival. Significant toxicity was noted in the September 18, 2002 sample for *Ceriodaphnia dubia* number of young per female. Neither endpoint for the *Hyalella azteca* showed any significant toxicity. Three of the four samples showed significant toxicity for the *Selenastrum capricornutum*. Toxicity data are shown in Table 3-7.

<u>Bioassessment:</u> Data not currently available.

<u>Fish Tissue:</u> Data not currently available.

<u>Los Penasquitos Data Analysis:</u> Specific conductance and sulfate were found to be persistently elevated except on the sample date in April, which occurred during a rain event. Although persistent toxicity was noted for *Selenastrum capricornutum,* no toxicity was found for any of the organisms during this April storm sampling event. Runoff from the April 24 rain event reduced the concentrations of specific conductance, sulfate, and selenium while increasing the turbidity and nutrients. The toxicity of the water decreased during the April storm probably due to the influx of fresh rain water. These trends are illustrated in Figure 3-4 which uses threshold values for chemical constituents as shown in Table 3-6. Although not persistently elevated, manganese and selenium are plotted for comparison with other waterbodies. Table 3-6 and 3-7 show results for water chemistry and toxicity data respectively.

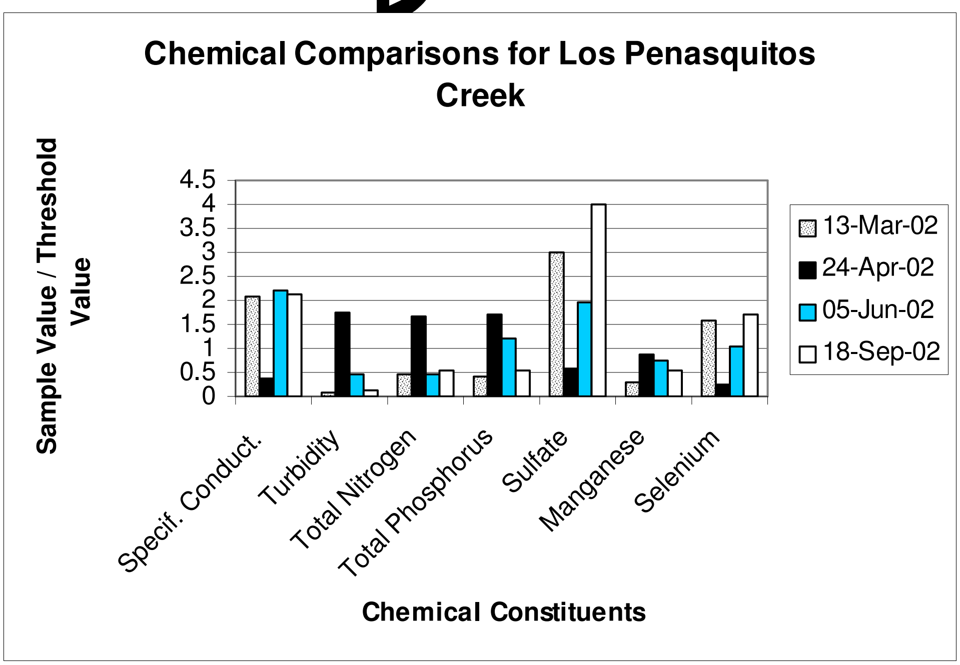

Figure 3-4. Chemical Comparisons for Los Penasquitos Creek

Table 3-6. Water Chemistry Results for Los Penasquitos Creek

Los Penasquitos Creek STATION 906LPLC6 Analyte	Units	Threshold Value [a,b]	Source	SampleDate 3/13/02 Value	Note	4/24/02 Value	Note	6/5/02 Value	Note	9/18/02 Value	Note
General/Physical											
pH	units	6.5 - 8.5	BP	8.7		8.1		8.1		7.5	
Specific Conductance	mS/cm	1.6	MCL	3.3		0.6		3.5		3.4	
Temp.	^0C			21		19		24		29	
Turbidity	ntu	20	BP	1.3		35		8.9		2.4	
Velocity	fps			1.2		0.61		0.34		0	
Saturated Oxygen	%			100		111		118		162	
Inorganics											
Alkalinity as CaCO3	mg/L	20000	EPA	143		51.2		293		144	
Ammonia as N	mg/L	1.5 / 7.3	EPA	0.07	d	0.11		0.07	d	0.06	
Nitrate + Nitrite as N	mg/L			0.075	e	0.99		0.09	e	0.059	e
Nitrogen, Total Kjeldahl	mg/L			0.37	d	0.66		0.37	d	0.5	
Nitrogen, Total (Calculated)	mg/L	1	BP	0.445		1.7		0.46		0.56	
OrthoPhosphate as P	mg/L			0.015		0.04		0.095		0.0053	
Phosphorus, Total as P	mg/L	0.1	BP	0.04	d	0.17		0.12		0.055	
Sulfate	mg/L	250	BP	746		149		490		1000	
Dissolved Metals											
Aluminum	µg/L	1000/200	MCL	1.3		11		12		1.9	
Arsenic	µg/L	50	MCL	3.6		2.5		8.3		3.1	
Cadmium	µg/L	3.1 / 7	CTR	-0.01		0.015		0.11		0.015	
Chromium	µg/L	50	MCL	1.56		0.78		0.75		0.25	
Copper	µg/L	13 / 20	CTR	4.7		4.6		7.0		4.7	
Lead	µg/L	4.1 / 105	CTR	-0.01		0.19		0.049		0.024	
Manganese	µg/L	50	MCL	15		44		38		27	
Nickel	µg/L	77 / 689	CTR	0.34		2.6		1.8		3.3	
Selenium	µg/L	5 / 20	USEPA	7.9		1.3		5.3		8.6	
Silver	µg/L	7.6	CTR	-0.01		-0.01		0.011		-0.008	
Zinc	µg/L	173 / 174	CTR	4.5		15.7		6.4		4.8	
OP Pesticides											
Azinphos methyl	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c	-0.03	c
Carbophenothion	µg/L	0.03	MDL	0.058		-0.03	c	-0.03	c	-0.03	c
Diazinon	µg/L	0.05 / 0.08	TMDL	0.031		0.095		0.02		-0.005	c
Dicrotophos	µg/L	0.03	MDL	0.06		-0.03	c	-0.03	c	-0.03	c
Dimethoate	µg/L	0.03	MDL	-0.03	c	0.075		0.062		-0.03	c
Dioxathion	µg/L	0.03	MDL	0.04	d	-0.03	c	-0.03	c	-0.03	c
Disulfoton	µg/L	0.01	MDL	0.03	d	0.215		0.03	d	-0.01	c
Ethoprop	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c	-0.03	c
Malathion	µg/L	0.03	MDL	-0.03	c	0.36		-0.03	c	-0.03	c
Mevinphos	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c	-0.03	c
Molinate	µg/L	0.1	MDL	-0.1	c	0.1	d	-0.1	c	-0.1	c
Naled(Dibrom)	µg/L	0.03	MDL	0.04	d	0.04	d	-0.03	c	-0.03	c
Parathion, Methyl	µg/L	0.01	MDL	-0.01	c	0.097		-0.01	c	-0.01	c

Los Penasquitos Creek STATION 906LPLC6 Analyte	Units	Threshold Value [a,b]	Source	SampleDate 3/13/02 Value	3/13/02 Note	4/24/02 Value	4/24/02 Note	6/5/02 Value	6/5/02 Note	9/18/02 Value	9/18/02 Note
Thiobencarb	µg/L	0.1	MDL	-0.1	c	0.925		-0.1	c	-0.1	c
OC Pesticides											
Dacthal	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c	-0.001	c
DDD(p,p')	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c	-0.001	c
DDE(p,p')	µg/L	0.001	MDL	-0.001	c	0.038		-0.001	c	-0.001	c
Endrin Aldehyde	µg/L	0.002	MDL	-0.002	c	0.003	d	-0.002	c	-0.002	c
Methoxychlor	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c	-0.001	c
Oxadiazon	µg/L	0.001	MDL	0.032		0.072		-0.001	c	0.0182	
Trianzine Herbicides											
Atrazine	µg/L	1	MCL	0.035	d	0.035	d	-0.02	c	-0.02	c
Propazine	µg/L	0.02	MDL	-0.02	c	-0.02	c	0.035	d	-0.02	c
Secbumeton	µg/L	0.02	MDL	0.035	d	0.375		0.275		-0.02	c
Terbuthylazine	µg/L	0.02	MDL	0.14		0.807		0.225		-0.02	c
PCBs											
none exceeding MDL or RL											
PAHs											
Naphthalene	µg/L	0.02	RL	-0.02	c	0.035	d	-0.02	c	-0.0125	c, f

Notes:

a Threshold values for MCLs are presented as primary MCL / secondary MCL.
b Threshold values for water quality values are presented as chronic / acute where both are available..
c Negative values signify that the constituent was not detected in the sample.
d Calculated value 1/2 distance between MDL and RL
e Laboratory Contamination
f A holding time violation has occurred; Surrogate Corrected value

Table 3-7. Toxicity Data for Los Penasquitos Creek

	Toxicity Species: Ceriodaphnia dubia	Ceriodaphnia dubia	Selenastrum capricornutum	Hyalella azteca	Hyalella azteca
Sample Type:	grab	grab	grab	integrated	integrated
Matrix:	water	water	water	sediment	sediment
Method	EPA 1994 (EPA 600/4-91/002)	EPA 1994 (EPA 600/4-91/002)	EPA 1994 (EPA 600/4-91/002)	EPA 2000 (EPA 600R-99/064)	EPA 2000 (EPA 600R-99/064)
Evaluation Threshold	80%	80%	80%	80%	80%
Statistical Method	Paired T-test	Paired T-test	Paired T-test	Paired T-test	Paired T-test
Toxic Test Duration	7 days	7 days	4 days	10 days	10 days
Toxic End Point	Survival (%)	Young/ female (#)	Total Cell Count	Growth (weight)	Survival (%)
Unit	%	Num/Rep	cells/ml	mg/ind	%
Rep Count	10	10	4	8	8

	Toxicity Species				
	Ceriodaphnia dubia		Selenastrum capricornutum	Hyalella azteca	
3/13/2002					
Mean	100	32	3608000	0.209	88
Standard Deviation	0	3	358887	0.085	11.6
Probability	0.084	0	0	0.003	0.5
Percent of Control	125	189	58.8	227	100
Tox Sig Effect Code	NSG	NSG	SL	SG	NSG
4/24/2002					
Mean	80	31	6128000	0.251	90
Standard Deviation	42.2	14	517430	0.032	10.7
Probability	0.084	0.367	0.178	0.162	0.215
Percent of Control	80	107	94.7	108	96
Tox Sig Effect Code	NSG	NSG	NSG	NSG	NSG
6/5/2002					
Mean	90	20	1150000	0.176	95
Standard Deviation	31.6	[illegible]	308329	0.024	7.56
Probability	0.278	0.357	0	0.005	0.385
Percent of Control	112.5	107	33.1	122	101
Tox Sig Effect Code	NSG	NSG	SL	SG	NSG
9/18/2002					
Mean	90	13	5268000	0.288/ 0.223	73/ 86
Standard Deviation	31.6	5	595987	0.017/ 0.041	8.9/ 12
Probability	0.5	0.001	0.006	0.324/ 0.011	0.196/ 0.131
Percent of Control	100	59.8	71	103/ 81	92/110
Tox Sig Effect Code	NSG	SL	SL	NSG/ SG	NSG/ NSG

TOXICITY SIGNIFICANT EFFECT CODES

SL - the sample is significantly different from the negative control and the sample is less than the 80% evaluation threshold (Both toxicity criteria met)

NSL - the sample is not significantly different from the negative control and the sample is less than the 80% evaluation threshold (only second toxicity criteria met, no conclusion can be drawn)

SG - the sample is significantly different from the negative control and the sample is greater than the 80% evaluation threshold (only first toxicity criteria met, no conclusion can be drawn)

NSG - the sample is not significantly different from the negative control and the sample is greater than the 80% evaluation threshold (neither toxicity criteria met)

3.5.2. Soledad Canyon Creek (906LPLSOL2)

Station 906LPLSOL2 on Soledad Canyon Creek is located in HA 906.10, downstream of the Interstate 805 crossing and is accessed from the Fresh Water Systems parking lot at 10360 Sorrento Valley Road. The photo in Figure 3-5 shows the sample location.

Figure 3-5. Soledad Canyon Creek Sample Location

Physical Parameters: Three samples exceeded the specific conductance threshold value by more than 20%, meeting the definition of persistently exceeded.

Inorganics: Three samples exceeded the sulfate Basin Plan objective by more than 20%, meeting the definition of persistently exceeded, and one sample was below the sulfate Basin Plan objective. One sample on April 24, 2002, exceeded the water quality objectives for total nitrogen and total phosphorus in flowing water of 1.0 mg/L and 0.1 mg/l, respectively.

Metals: All four samples exceeded the Basin Plan objective for manganese by more than 20%, meeting the definition of persistently exceeded. Three samples exceeded the CTR chronic criteria for selenium by more than 20%, meeting the definition of persistently exceeded.

PAH and PCB: No detections.

Pesticides and Herbicides: Diazinon was detected in all four samples and one sample exceeded both the acute and chronic TMDL criteria. DDT(p,p') was detected in one sample which exceeded the chronic CTR critieria. Oxadiazon and terbuthylazine were detected in all four samples. Disulfoton was detected in three samples. HCH (beta), atrazine, and secbumeton were detected in two samples. Azinphos methyl, carbophenothion, coumaphos, dimethoate, dioxathion, fenthion, mevinphos, molinate, naled(dibrom), ethyl parathion, methyl parathion, thiobencarb, tokuthion, chlordene (alpha), dacthal, DDE(p,p'), endosulfan I, endosulfan sulfate, HCH (alpha), HCH (gamma), and propazine were detected in one sample.

Toxicity: Persistent toxicity was noted for *Hyalella azteca* percent survival and *Selenastrum capricornutum.* There was no significant toxicity for the *Ceriodaphnia* *dubia* percent survival. Significant toxicity was noted in the sample on September 18, 2002 for *Ceriodaphnia dubia* number of young per female. One sample showed significant toxicity for the *Hyalella azteca* growth weight. Two samples showed significant toxicity for the *Hyalella azteca* percent survival. A third *Hyalella azteca* percent survival sample had a duplicate run and both were below the 80% threshold, but one was not significantly different from the control. Three of the four samples showed significant toxicity for the *Selenastrum capricornutum.* Toxicity data are shown in Table 3-9.

<u>Bioassessment:</u> Data not currently available.

<u>Fish Tissue:</u> Data not currently available.

<u>Soledad Canyon Creek Data Analysis:</u> Specific conductance, sulfate, and selenium were found to be persistently elevated except on the sample date in April, which occurred during a rain event. Manganese concentrations were persistently elevated in all samples and not affected much by the storm flows. Although persistent toxicity was noted for *Selenastrum capricornutum,* no water column toxicity was found during this April storm sampling event. Runoff from the April 24 rain event reduced the concentrations of specific conductance, sulfate, manganese, and selenium while increasing the turbidity and nutrients. The toxicity of the water decreased during the April storm probably due to the influx of fresh rain water. Persistent sediment toxicity was noted even during the storm. These trends are illustrated in Figure 3-6 which uses threshold values for chemical constituents as shown in Table 3-8. Table 3-8 and 3-9 show results for water chemistry and toxicity data respectively.

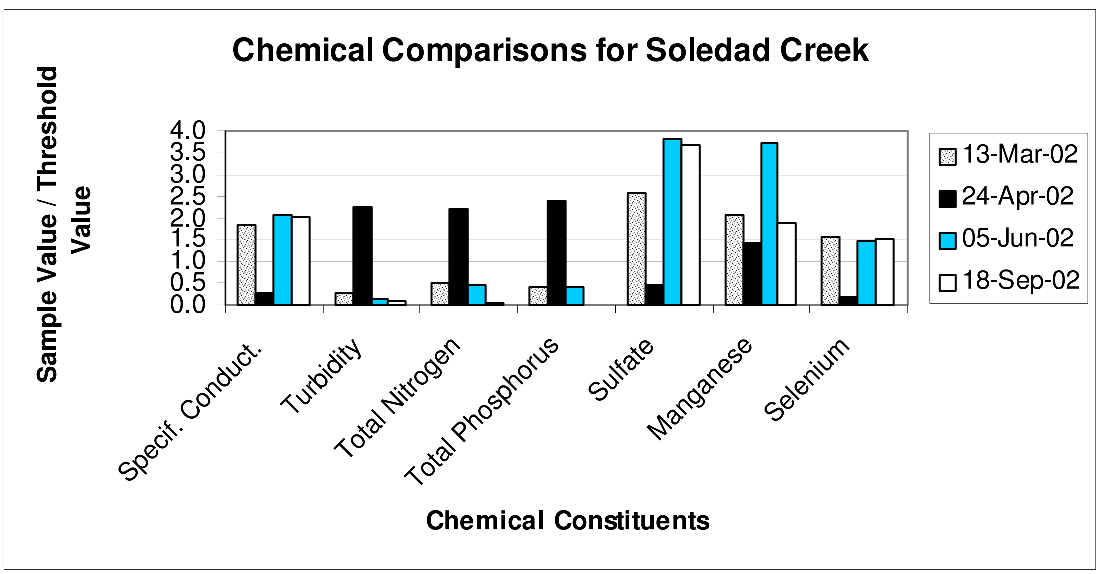

Figure 3-6. Chemical Comparisons for Soldedad Canyon Creek

Table 3-8. Water Chemistry Results for Soledad Canyon Creek

Soledad Canyon Creek STATION 906LPRSC4 Analyte	Units	Threshold Value [a,b]	Source	SampleDate 3/13/02 Value	Note	4/24/02 Value	Note	6/5/02 Value	Note	9/18/02 Value	Note
General/Physical											
pH	units	6.5 - 8.5	BP	8.2		7.7		7.9		7.9	
Specific Conductance	mS/cm	1.6	MCL	3.0		0.48		3.3		3.3	
Temp.	^0C			18		18		23		22	
Turbidity	ntu	20	BP	5.9		45		3.2		2.3	
Velocity	fps			1.3		1.7		2.7		nd	
Saturated Oxygen	%			100		109		115		196	
Inorganics											
Alkalinity as CaCO3	mg/L	20000	EPA	199		49		211		206	
Ammonia as N	mg/L	1.5 / 7.3	EPA	0.07	d	0.22		0.07	d	0.062	
Nitrate + Nitrite as N	mg/L			0.15	e	0.95		0.088	e	0.056	e
Nitrogen, Total Kjeldahl	mg/L			0.37	d	1.2		0.37	d	-0.25	c
Nitrogen, Total (Calculated)	mg/L	[illegible]	BP	0.5		2.2		0.5		-0.2	
OrthoPhosphate as P	mg/L			0.024		0.088		0.018		0.0086	
Phosphorus, Total as P	mg/L	0.1	BP	0.04	d	0.24		0.04	d	-0.03	
Sulfate	mg/L	250	BP	641		118		950		918	
Dissolved Metals											
Aluminum	µg/L	1000/200	MCL	1.3		11.8		12.3		2.8	
Arsenic	µg/L	50	MCL	3.3		2.6		8.3		2.9	
Cadmium	µg/L	3.1 / 7	CTR	0.012		0.021		0.041		0.019	
Chromium	µg/L	50	MCL	1.8		0.82		0.88		0.27	
Copper	µg/L	13 / 20	CTR	3.7		4.7		3.2		3.9	
Lead	µg/L	4.1 / 105	CTR	-0.01	c	0.15		0.15		0.0056	
Manganese	µg/L	50	MCL	103		71		186		95	
Nickel	µg/L	77 / 689	CTR	0.15		2.5		2.6		2.7	
Selenium	µg/L	5 / 20	USEPA	7.7		0.87		7.3		7.6	
Silver	µg/L	7.6	CTR	-0.01	c	-0.01	c	0.0151		-0.008	c
Zinc	µg/L	173 / 174	CTR	5.7		23		5.0		4.3	
OP Pesticides											
Azinphos methyl	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c	-0.03	c
Carbophenothion	µg/L	0.03	MDL	0.04	d	-0.03	c	-0.03	c	-0.03	c
Coumaphos	µg/L	0.04	MDL	-0.04	c	0.05	d	-0.04	c	-0.04	c
Diazinon	µg/L	0.05 / 0.08	TMDL	0.032		0.11		0.013	d	0.013	d
Dimethoate	µg/L	0.03	MDL	-0.03	c	0.1		-0.03	c	-0.03	c
Dioxathion	µg/L	0.03	MDL	0.04	d	-0.03	c	-0.03	c	-0.03	c
Disulfoton	µg/L	0.01	MDL	0.03	d	0.22		0.03	d	-0.01	c
Fenthion	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c	-0.03	c
Mevinphos	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c	-0.03	c
Molinate	µg/L	0.1	MDL	-0.1	c	0.1	d	-0.1	c	-0.1	c
Naled(Dibrom)	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c	-0.03	c
Parathion, Ethyl	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c	-0.03	c
Parathion, Methyl	µg/L	0.01	MDL	-0.01	c	0.03	d	-0.01	c	-0.01	c

Soledad Canyon Creek STATION 906LPRSC4 Analyte	Units	Threshold Value [a,b]	Source	SampleDate 3/13/02 Value	Note	4/24/02 Value	Note	6/5/02 Value	Note	9/18/02 Value	Note
Thiobencarb	µg/L	0.1	MDL	-0.1	c	0.1	d	-0.1	c	-0.1	c
Tokuthion	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c	-0.03	c
OC Pesticides											
Chlordene, alpha	µg/L	0.001	MDL	-0.001	c	-0.001	c	-0.001	c	0.012	
Dacthal	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c	-0.001	c
DDE(p,p')	µg/L	0.001	MDL	-0.001	c	0.031		-0.001	c	-0.001	c
DDT(p,p')	µg/L	0.001 / 1.1	CTR	0.003	d	-0.002	c	-0.002	c	-0.002	c
Endosulfan I	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c	-0.001	c
Endosulfan sulfate	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c	-0.001	c
HCH, alpha	µg/L	0.001	MDL	-0.0[illegible]	c	0.001	d	-0.001	c	-0.001	c
HCH, beta		0.001		-0.001	c	0.001	d	-0.001	c	0.006	
HCH, gamma		0.001		[illegible].001	c	0.001	d	-0.001	c	-0.001	c
Oxadiazon	µg/L	0.00[illegible]	MDL	0.027		0.053		0.052		0.0209	
Trianzine Herbicides											
Atrazine	µg/L	[illegible]	MCL	0.035	d	0.035	d	-0.02	c	-0.02	c
Propazine	µg/L	0.02	MDL	-0.02	c	-0.02	c	0.105		-0.02	c
Secbumeton	µg/L	0.02	MDL	0.16		-0.02	c	0.2		-0.02	c
Terbuthylazine	µg/L	0.02	MDL	0.25		0.15		0.187		0.214	
PCBs											
none exceeding MDL or RL											
PAHs											
none exceeding MDL or RL											

Notes:
a Threshold values for MCLs are presented as primary MCL / secondary MCL.
b Threshold values for water quality values are presented as chronic / acute where both are available.
c Negative values signify that the constituent was not detected in the sample.
d Calculated value 1/2 distance between MDL and RL
e Laboratory Contamination

Table 3-9. Toxicity Data for Soledad Canyon Creek

Soledad Canyon Creek	Toxicity Species				
	Ceriodaphnia dubia		**Selenastrum capricornutum**	**Hyalella azteca**	
Sample Type:	grab		grab	integrated	
Matrix:	water		water	sediment	
Method	EPA 1994 (EPA 600/4-91/002)		EPA 1994 (EPA 600/4-91/002)	EPA 2000 (EPA 600R-99/064)	
Evaluation Threshold	80%		80%	80%	
Statistical Method	Paired T-test		Paired T-test	Paired T-test	
Toxic Test Duration	7 days	7 days	4 days	10 days	10 days
Toxic End Point	Survival (%)	Young/ female (#)	Total Cell Count	Growth (weight)	Survival (%)

Soledad Canyon Creek	Toxicity Species				
	Ceriodaphnia dubia		Selenastrum capricornutum	Hyalella azteca	
Unit	%	Num/Rep	cells/ml	mg/ind	%
Rep Count	10	10	4	8	8
<u>3/13/2002</u>					
Mean	100	32	3608000	0.209	88
Standard Deviation	0	3	358887	0.085	11.6
Probability	0.084	0	0	0.003	0.5
Percent of Control	125	189	58.8	227	100
Tox Sig Effect Code	NSG	NSG	SL	SG	NSG
<u>4/24/2002</u>					
Mean	80	31	6128000	0.251	90
Standard Deviation	42.2	14	517430	0.032	10.7
Probability	0.084	0.367	0.178	0.162	0.215
Percent of Control	80	107	94.7	108	96
Tox Sig Effect Code	NSG	NSG	NSG	NSG	NSG
<u>6/5/2002</u>					
Mean	90	20	1150000	0.176	95
Standard Deviation	31.6	3	308329	0.024	7.56
Probability	0.278	0.357	0	0.005	0.385
Percent of Control	112.5	107	33.1	122	101
Tox Sig Effect Code	NSG	NSG	SL	SG	NSG
<u>9/18/2002</u>					
Mean	90	13	5268000	0.288/ 0.223	73/ 86
Standard Deviation	31.6	5	595987	0.017/ 0.041	8.9/ 12
Probability	0.5	0.001	0.006	0.324/ 0.011	0.196/ 0.131
Percent of Control	100	59.8	71	103/ 81	92/110
Tox Sig Effect Code	NSG	SL	SL	NSG/ SG	NSG/ NSG

<u>TOXICITY SIGNIFICANT EFFECT CODES</u>

SL - the sample is significantly different from the negative control and the sample is less than the 80% evaluation threshold (Both toxicity criteria met)

NSL - the sample is not significantly different from the negative control and the sample is less than the 80% evaluation threshold (only second toxicity criteria met, no conclusion can be drawn)

SG - the sample is significantly different from the negative control and the sample is greater than the 80% evaluation threshold (only first toxicity criteria met, no conclusion can be drawn)

NSG - the sample is not significantly different from the negative control and the sample is greater than the 80% evaluation threshold (neither toxicity criteria met)

3.5.3. POWAY CREEK (906LPPOW2)

Station 906LPPOW2 on Poway Creek is located in HA 6.20 between the Poway Community Park and mobile park. Accessed via Oak Knoll Rd & RTS 2. The photo in Figure 3-7 shows the sample location.

Figure 3-7. Poway Creek Sample Location.

<u>Physical Parameters:</u> Four samples exceeded the specific conductance threshold value by more than 20%, meeting the definition of persistently exceeded.

<u>Inorganics:</u> All four samples exceeded the total nitrogen Basin Plan objective for flowing water by more than 20%, meeting the definition of persistently exceeded. One sample on September 18, 2002, exceeded the water quality objective for total phosphorus in flowing water of 0.1 mg/L. Three samples exceeded the sulfate water quality objective of 250 mg/L.

<u>Metals:</u> All four samples exceeded the manganese Basin Plan objective by more than 20%, meeting the definition of persistently exceeded. Three samples exceeded the selenium Basin Plan objective by more than 20% and one just exceeded the Basin Plan objective, meeting the definition of persistently exceeded.

<u>PAH and PCB:</u> No detections.

<u>Pesticides and Herbicides:</u> Diazinon was detected in all four samples and one sample exceeded the chronic criteria. Disulfoton and oxadiazon were detected in three samples. Dimethoate, atrazine, secbumeton, and terbuthylazine were detected in two samples. Dicrotophos, dioxathion, methyl parathion, gamma chlordene, DDE(p,p'), endosulfan II, endrin, HCH (beta and delta), and propazine were detected in one sample.

<u>Toxicity:</u> Persistent toxicity was noted for both *Hyalella azteca* endpoints and for *Selenastrum capricornutum.* There was no significant toxicity for the *Ceriodaphnia dubia* percent survival. Significant toxicity was noted in the sample on September 18, 2002 for *Ceriodaphnia dubia* number of young per female. One sample showed significant toxicity for the *Hyalella azteca* growth weight. A duplicate *Hyalella azteca* test was run for the sample on Septermber 18, 2002. The duplicate test found

significantly lower growth weight in one duplicate, but not the other and no significant toxicity for percent survival. Also, significant *Hyalella azteca* percent survival toxicity was noted in two samples. All four samples showed significant toxicity for the *Selenastrum capricornutum*. Toxicity data are shown in Table 3-X.

<u>Bioassessment:</u> Data not currently available.

<u>Fish Tissue:</u> Data not currently available.

<u>Poway Creek Data Analysis:</u> Specific conductance, total nitrogen, manganese, and selenium were found to be persistently elevated. Persistent toxicity was noted for both *Hyalella azteca* endpoints and for *Selenastrum capricornutum.* Samples from Poway Creek showed no discernable response to the April storm. Concentrations were fairly stable for all constituents. Toxicity was found during this April storm sampling event for *Selenastrum capricornutum* unlike in the creeks which showed a response to the storm. These trends are illustrated in Figure 3-8 which uses threshold values for chemical constituents as shown in Table Table 3-10. Table Table 3-10 and Table 3-11 show results for water chemistry and toxicity data respectively.

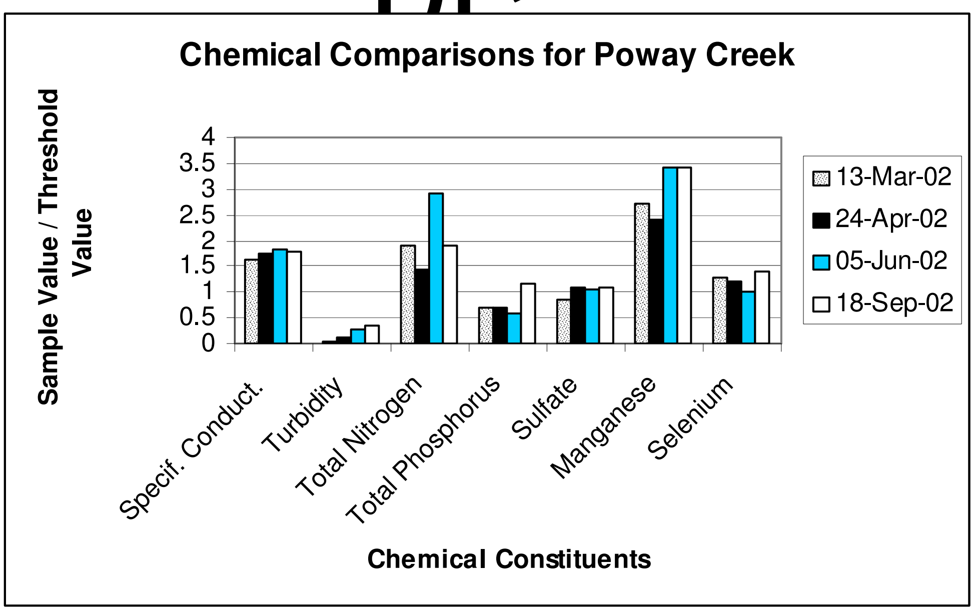

Figure 3-8. Chemical Comparisons for Poway Creek

Table 3-10. Water Chemistry for Poway Creek

Poway Creek STATION 906LPPOW2 Analyte	Units	Threshold Value [a,b]	Source	SampleDate 3/13/02 Value	 Note	 4/24/02 Value	 Note	 6/5/02 Value	 Note	 9/18/02 Value	 Note
General/Physical											
pH	units	6.5 - 8.5	BP	8.04		7.64		7.7		7.5	
Specific Conductance	mS/cm	1.6	MCL	2.6		2.8		2.9		2.9	
Temp.	^{0}C			13		15		19		19	
Turbidity	ntu	20	BP	0.5		2		5.3		7.2	
Velocity	fps			0.76		nd		nd		1.9	
Saturated Oxygen	%			97		65		55		92	
Inorganics											
Alkalinity as CaCO3	mg/L	20000	EPA	308		310		314		316	
Ammonia as N	mg/L	1.5 / 7.3	EPA	0.11		0.070	d	0.070	d	0.062	
Nitrate + Nitrite as N	mg/L			0.87		1.4		0.8		2.4	
Nitrogen, Total Kjeldahl	mg/L			0.50		0.56		0.58		0.57	
Nitrogen, Total (Calculated)	mg/L	1	BP	1.4		1.9		1.4		2.9	
OrthoPhosphate as P	mg/L			0.071		0.07		0.049		0.067	
Phosphorus, Total as P	mg/L	0.1	BP	0.07		0.07		0.06		0.12	
Sulfate	mg/L	250	BP	210		272		260		275	
Dissolved Metals											
Aluminum	µg/L	1000/200	MCL	1.9		4.4		2.7		1.4	
Arsenic	µg/L	50	MCL	3.0		2.8		5.6		3.4	
Cadmium	µg/L	3.1 / 7	CTR	0.010		-0.01	c	0.073		0.031	
Chromium	µg/L	50	MCL	4.3		0.22		0.44		0.35	
Copper	µg/L	13 / 20	CTR	1.7		1.5		3.6		2.6	
Lead	µg/L	4.1 / 105	CTR	-0.01	c	-0.01	c	0.015		0.042	
Manganese	µg/L	50	MCL	136		120		170		170	
Nickel	µg/L	77 / 689	CTR	0.86		1.1		1.7		4.1	
Selenium	µg/L	5 / 20	USEPA	6.3		6.1		5.1		7.1	
Silver	µg/L	7.6	CTR	-0.01	c	0.018		-0.01	c	-0.008	c
Zinc	µg/L	173 / 174	CTR	4.9		3.6		3.3		8.0	
OP Pesticides											
Diazinon	µg/L	0.05 / 0.08	TMDL	0.045		0.013	d	0.046		0.055	
Dicrotophos	µg/L	0.03	MDL	0.04	d	-0.03	c	-0.03	c	-0.03	c
Dimethoate	µg/L	0.03	MDL	-0.03	c	0.04	d	0.09		-0.03	c
Dioxathion	µg/L	0.03	MDL	0.04	d	-0.03	c	-0.03	c	-0.03	c
Disulfoton	µg/L	0.01	MDL	0.03	d	0.03	d	0.03	d	-0.01	c
Parathion, Methyl	µg/L	0.01	MDL	-0.01	c	0.03	d	-0.01	c	-0.01	c
OC Pesticides											
Chlordene, gamma	µg/L	0.001	MDL	0.001	d	-0.001		-0.001	c	-0.001	c
DDE(p,p')	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c	-0.001	c
Endosulfan II	µg/L	0.001	MDL	-0.001	c	-0.001		-0.001	c	0.0041	
Endrin	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c	-0.001	c
HCH, beta	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c	-0.001	c
HCH, delta	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c	-0.001	c

Poway Creek STATION 906LPPOW2 Analyte	Units	Threshold Value [a,b]	Source	SampleDate 3/13/02 Value	Note	4/24/02 Value	Note	6/5/02 Value	Note	9/18/02 Value	Note
Oxadiazon	µg/L	0.001	MDL	0.001	d	0.009		-0.001	c	0.01	
Trianzine Herbicides											
Atrazine	µg/L	1	MCL	0.1		0.035	d	-0.02	c	-0.02	c
Propazine	µg/L	0.02	MDL	-0.02	c	-0.02	c	0.12		-0.02	c
Secbumeton	µg/L	0.02	MDL	0.15		-0.02	c	0.26		-0.02	c
Terbuthylazine	µg/L	0.02	MDL	0.22		-0.02	c	0.26		-0.02	c
PCBs											
none exceeding MDL or RL											
PAHs											
none exceeding MDL or RL											

Notes:
a Threshold values for MCLs are presented as primary MCL / secondary MCL.
b Threshold values for water quality values are presented as chronic / acute where both are available..
c Negative values signify that the constituent was not detected in the sample.
d Calculated value 1/2 distance between MDL and RL
e Laboratory Contamination

Table 3-11. Toxicity Data For Poway Creek

Poway Creek	Toxicity Species: Ceriodaphnia dubia		Selenastrum capricornutum	Hyalella azteca	
Sample Type:	grab		grab	integrated	
Matrix:	water		water	sediment	
Method	EPA 1994 (EPA 600/4-91/002)		EPA 1994 (EPA 600/4-91/002)	EPA 2000 (EPA 600R-99/064)	
Evaluation Threshold	80%		80%	80%	
Statistical Method	Paired T-test		Paired T-test	Paired T-test	
Toxic Test Duration	7 days	7 days	4 days	10 days	10 days
Toxic End Point	Survival (%)	Young/ female (#)	Total Cell Count	Growth (weight)	Survival (%)
Unit	%	Num/Rep	cells/ml	mg/ind	%
Rep Count	10	10	4	8	8
3/13/2002					
Mean	100	33	3973000	0.293	25
Standard Deviation	0	3	218098	0.227	21.4
Probability	0.084	0	0	0.02	0
Percent of Control	125	196	64.8	319	28.6
Tox Sig Effect Code	NSG	NSG	SL	SG	SL

Poway Creek	Toxicity Species				
	Ceriodaphnia dubia		Selenastrum capricornutum	Hyalella azteca	
4/24/2002					
Mean	100	26	2888000	0.178	60
Standard Deviation	0	6	127541	0.058	22
Probability	0.5	0.206	0	0.023	0.001
Percent of Control	100	91.9	44.7	76.4	64
Tox Sig Effect Code	NSG	NSG	SL	SL	SL
6/5/2002					
Mean	100	16	780000	0.156	79
Standard Deviation	0	5	192873	0.03	10.7
Probability	0.084	0.253	0	0.197	0.006
Percent of Control	125	86.5	22.4	108	83.8
Tox Sig Effect Code	NSG	NSG	SL	NSG	SG
9/18/2002					
Mean	90	16	4343000	0.223/ 0.168	60/ 69
Standard Deviation	31.6	[illegible]	239653	0.067/ 0.072	28/ 20
Probability	0.5	0.007	0.003	0.04/ .002	0.063/ 0.151
Percent of Control	100	13.3	58.5	80/ 61	77/ 88
Tox Sig Effect Code	NSG	SL	SL	SG/ SL	NSL/ NSG

TOXICITY SIGNIFICANT EFFECT CODES

SL - the sample is significantly different from the negative control and the sample is less than the 80% evaluation threshold (Both toxicity criteria met)

NSL - the sample is not significantly different from the negative control and the sample is less than the 80% evaluation threshold (only second toxicity criteria met, no conclusion can be drawn)

SG - the sample is significantly different from the negative control and the sample is greater than the 80% evaluation threshold (only first toxicity criteria met, no conclusion can be drawn)

NSG - the sample is not significantly different from the negative control and the sample is greater than the 80% evaluation threshold (neither toxicity criteria met)

3.5.4. ROSE CANYON CREEK (906LPRSC4)

Station 906LPRSC4 on Rose Canyon Creek is located in HA 6.40 in Marian Bear Memorial Natural Park, near State Route 52 and the 258 railroad marker. The photo in Figure 3-9 shows the sample location.

Figure 3-9. Rose Canyon Creek Sample Location

Physical Parameters: One sample had an elevated pH of 8.66; above the Basin Plan objective of 8.5. Three samples exceeded the specific conductance threshold value by more than 20%, meeting the definition of persistently exceeded.

Inorganics: All four samples exceeded the Basin Plan sulfate objective by more than 20%, meeting the definition of persistently exceeded. One sample on April 24, 2002, exceeded the water quality objectives for total nitrogen and total phosphorus in flowing water of 1.0 mg/L and 0.1 mg/L, respectively.

Metals: Two samples exceeded the manganese Basin Plan objective by more than 20%. Three samples exceeded the selenium CTR chronic criteria by more than 20%, meeting the definition of persistently exceeded.

PAH and PCB: No detections.

Pesticides and Herbicides: Diazinon was detected in all four samples and two samples exceeded both the acute and chronic criteria. DDT(p,p') was detected in one sample which exceeded the chronic CTR criteria. Oxadiazon and terbuthylazine were detected in all four samples. Disulfoton was detected in three samples. Naled(Dibrom), chlordene (gamma), atrazine, and secbumeton were detected in two samples. Carbophenothion, dimethoate, dioxathion, fenthion, mevinphos, molinate, thiobencarb, trichloronate, aldrin, dacthal, DDE(p,p'), endosulfan II, HCH (alpha), atraton, and propazine were detected in one sample.

Bioassessment: Data not currently available.

Fish Tissue: Data not currently available.

Toxicity: Persistent toxicity was noted for *Hyalella azteca* growth weight and *Selenastrum capricornutum*. One sample from April 24, 2002, showed significant toxicity for the *Ceriodaphnia dubia* percent survival. Significant toxicity was noted in the sample on September 18, 2002 for *Ceriodaphnia dubia* number of young per female. Two samples showed significant toxicity for the *Hyalella azteca* growth weight. Significant *Hyalella azteca* percent survival toxicity was noted in one sample. Three of four samples showed significant toxicity for the *Selenastrum capricornutum*. Toxicity data are shown in Table 3-X.

Rose Canyon Creek Data Analysis: Specific conductance, sulfate and selenium were found to be persistently elevated. Concentrations of specific conductance, sulfate, and selenium decreased during the storm sampling on April 24, 2002 while concentrations of turbidity and nutrients increased. Although persistent toxicity was noted for *Selenastrum capricornutum,* no *Selenastrum capricornutum* toxicity was found during this April storm sampling event. The toxicity of the water decreased during the April storm probably due to the influx of fresh rain water. Persistent sediment toxicity was noted even during the storm. These trends are illustrated in Figure 3-10 which uses threshold values for chemical constituents as shown in Table 3-12. Table 3-12 and Table 3-13 show results for water chemistry and toxicity data respectively.

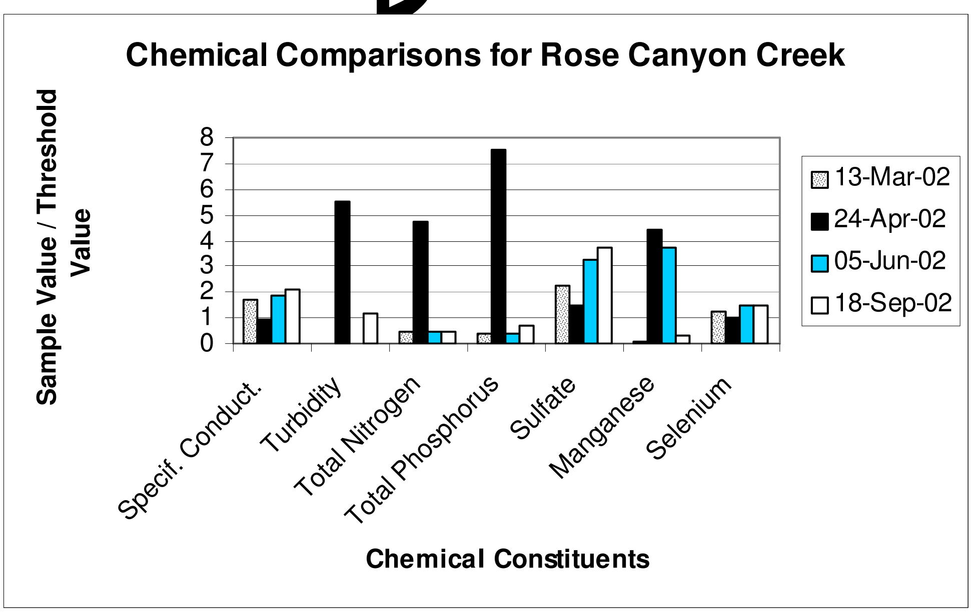

Figure 3-10. Chemical Comparisons for Rose Canyon Creek

Table 3-12. Water Chemistry Results for Rose Canyon Creek

Rose Canyon Creek STATION 906LPRSC4 Analyte	Units	Threshold Value [a,b]	Source	Sample Date 3/13/02 Value	Note	4/24/02 Value	Note	6/5/02 Value	Note	9/18/02 Value	Note
General/Physical											
pH	units	6.5 - 8.5	BP	8.7		7.5		8.3		7.5	
Specific Conductance	mS/cm	1.6	MCL	2.8		1.5		3.0		3.4	
Temp.	^{0}C			15		16		20		28	
Turbidity	ntu	20	BP	0.71		110		0.75		23	
Velocity	fps			1.1		nd		2.1		0.47	
Saturated Oxygen	%			100		102		148		122	
Inorganics											
Alkalinity as CaCO3	mg/L	20000	EPA	[illegible]		125		202		192	
Ammonia as N	mg/L	1.5 / 7.3	EPA	0.07	d	0.26		0.07	d	0.071	
Nitrate + Nitrite as N	mg/L			0.08	e	2.0		0.081	e	0.064	e
Nitrogen, Total Kjeldahl	mg/L			0.37	d	2.72		0.37	d	0.42	
Nitrogen, Total (Calculated)	mg/L		BP	0.5		4.7		0.5		0.5	
OrthoPhosphate as P	mg/L			0.014		0.15		0.011		0.038	
Phosphorus, Total as P	mg/L	0.1	BP	0.04	d	0.75		0.04	d	0.071	
Sulfate	mg/L	250	BP	554		377		807		928	
Dissolved Metals											
Aluminum	µg/L	1000/200	MCL	1.3		18		12		28	
Arsenic	µg/L	50	MCL	2.6		3.6		8.3		3.6	
Cadmium	µg/L	3.1 / 7	CTR	0.032		0.037		0.041		0.037	
Chromium	µg/L	50	MCL	1.8		0.8		0.9		0.41	
Copper	µg/L	13 / 20	CTR	5.9		7.7		3.2		4.9	
Lead	µg/L	4.1 / 105	CTR	-0.01	c	0.29		0.15		0.046	
Manganese	µg/L	50	MCL	5.0		221		186		17	
Nickel	µg/L	77 / 689	CTR	2.4		5.5		2.6		5.4	
Selenium	µg/L	5 / 20	USEPA	6.2		4.9		7.3		7.2	
Silver	µg/L	7.6	CTR	-0.01	c	-0.01	c	0.015		0.011	
Zinc	µg/L	173 / 174	CTR	8.6		38		5.0		5.4	
OP Pesticides											
Carbophenothion	µg/L	0.03	MDL	0.04	d	-0.03	c	-0.03	c	-0.03	c
Diazinon	µg/L	0.05 / 0.08	TMDL	0.12		0.21		0.02		0.033	
Dimethoate	µg/L	0.03	MDL	-0.03	c	0.062		-0.03	c	-0.03	c
Dioxathion	µg/L	0.03	MDL	0.04	d	-0.03	c	-0.03	c	-0.03	c
Disulfoton	µg/L	0.01	MDL	0.074		0.106		0.03	d	-0.01	c
Fenthion	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c	-0.03	c
Mevinphos	µg/L	0.03	MDL	-0.03	c	0.05		-0.03	c	-0.03	c
Molinate	µg/L	0.1	MDL	-0.1	c	0.1	d	-0.1	c	-0.1	c
Naled(Dibrom)	µg/L	0.03	MDL	0.04	d	0.04	d	-0.03	c	-0.03	c
Thiobencarb	µg/L	0.1	MDL	-0.1	c	0.3		-0.1	c	-0.1	c
Trichloronate	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c	-0.03	c
OC Pesticides											
Aldrin	µg/L	3	CTR	-0.001	c	-0.001	c	-0.001	c	0.003	

Rose Canyon Creek STATION 906LPRSC4 Analyte	Units	Threshold Value [a,b]	Source	Sample Date 3/13/02 Value	Note	4/24/02 Value	Note	6/5/02 Value	Note	9/18/02 Value	Note
Chlordene, gamma	µg/L	0.001	MDL	0.005		-0.001	c	0.001	d	-0.001	c
Dacthal	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c	-0.001	c
DDE(p,p')	µg/L	0.001	MDL	-0.001	c	0.035		-0.001	c	-0.001	c
DDT(p,p')	µg/L	0.001 / 1.1	CTR	-0.002	c	-0.002	c	0.003	d	-0.002	c
Endosulfan II	µg/L	0.001	MDL	-0.001	c	-0.001	c	-0.001	c	0.006	
HCH, alpha	µg/L	0.001	MDL	-0.001	c	-0.001	c	0.038		-0.001	c
Oxadiazon	µg/L	0.001	MDL	0.15		0.09		0.14		0.025	
Trianzine Herbicides											
Atraton	µg/L	0.02	MDL	-0.02	c	0.13		-0.02	c	-0.02	c
Atrazine	µg/L	1	MCL	0.1		0.035	d	-0.02	c	-0.02	c
Propazine	µg/L	0.02	MDL	-0.02	c	-0.02	c	0.035	d	-0.02	c
Secbumeton	µg/L	0.02	MDL	0.5		-0.02	c	0.152		-0.02	c
Terbuthylazine	µg/L	0.02	MDL	1.25		0.37		0.667		1.25	
PCBs											
none exceeding MDL or RL											
PAHs											
none exceeding MDL or RL											

Notes:
a Threshold values for MCLs are presented as primary MCL / secondary MCL.
b Threshold values for water quality values are presented as chronic / acute where both are available.
c Negative values signify that the constituent was not detected in the sample.
d Calculated value 1/2 distance between MDL and RL
e Laboratory Contamination

Table 3-13. Toxicity Data for Rose Canyon Creek

Rose Canyon Creek	Toxicity Species: Ceriodaphnia dubia		Selenastrum capricornutum	Hyalella azteca	
Sample Type:	grab		grab	integrated	
Matrix:	water		water	sediment	
Method	EPA 1994 (EPA 600/4-91/002)		EPA 1994 (EPA 600/4-91/002)	EPA 2000 (EPA 600R-99/064)	
Evaluation Threshold	80%		80%	80%	
Statistical Method	Paired T-test		Paired T-test	Paired T-test	
Toxic Test Duration	7 days	7 days	4 days	10 days	10 days
Toxic End Point	Survival (%)	Young/ female (#)	Total Cell Count	Growth (weight)	Survival (%)
Unit	%	Num/Rep	cells/ml	mg/ind	%
Rep Count	10	10	4	8	8

Rose Canyon Creek	Toxicity Species				
	Ceriodaphnia dubia		Selenastrum capricornutum	Hyalella azteca	
3/13/2002					
Mean	100	34	4508000	No Data	No Data
Standard Deviation	0	4	333866	No Data	No Data
Probability	0.084	0	0.001	No Data	No Data
Percent of Control	125	197	73.5	No Data	No Data
Tox Sig Effect Code	NSG	NSG	SL	See Note below	
4/24/2002					
Mean	0	-88	6613000	0.151	74
Standard Deviation	0	-88	1178063	0.077	15.1
Probability	0	-88	0.[illegible]5	0.012	0.003
Percent of Control	0	-88	10[illegible]	65.1	78.7
Tox Sig Effect Code	SL	No Surviving Adults	NSG	SL	SL
6/5/2002					
Mean	90	[illegible]6	1837500	0.176	90
Standard Deviation	31.6	[illegible]	252900	0.037	7.56
Probability	0.278	0.296	0	0.032	0.437
Percent of Control	112.5	87.7	52.9	75.8	101
Tox Sig Effect Code	NSG	NSG	SL	SL	NSG
9/18/2002					
Mean	90	17	5603000	No Data	No Data
Standard Deviation	31.6	4	601193	No Data	No Data
Probability	0.5	0.011	0.012	No Data	No Data
Percent of Control	100	74.8	75.5	No Data	No Data
Tox Sig Effect Code	NSG	SL	SL	See Note below	

TOXICITY SIGNIFICANT EFFECT CODES

SL - the sample is significantly different from the negative control and the sample is less than the 80% evaluation threshold (Both toxicity criteria met)

NSL - the sample is not significantly different from the negative control and the sample is less than the 80% evaluation threshold (only second toxicity criteria met, no conclusion can be drawn)

SG - the sample is significantly different from the negative control and the sample is greater than the 80% evaluation threshold (only first toxicity criteria met, no conclusion can be drawn)

NSG - the sample is not significantly different from the negative control and the sample is greater than the 80% evaluation threshold (neither toxicity criteria met)

Note:

Sediment was not collected due to the site consisting of small pebbles and large rocks.

3.5.5. TECOLOTE CREEK (906LPTEC3)

Station 906LPTEC3 on Tecoloted Creek is located in HA 6.50 in Tecolote Canyon Natural Park, east of the Interstate 5 and Sea World, 0.6 miles in from the Ranger Station. The photo in Figure 3-11 shows the sample location.

Figure 3-11. Tecolote Creek Sample Location

Physical Parameters: Three samples exceeded the specific conductance threshold value by more than 20%, meeting the definition of persistently exceeded. Specific conductance and TDS measure similar properties in water. Because there is no TDS Basin Plan objective for Tecolote Creek, it may not be appropriate to use a threshold value for specific conductance. The specific conductance threshold value is established at the Basin Plan objective for the other watersheds and is included for comparison purposes.

Inorganics: All three samples exceeded the sulfate threshold value by more than 20%, meeting the definition of persistently exceeded. Because there is no sulfate Basin Plan objective for Tecolote Creek, it may not be appropriate to use a threshold value for sulfate. The sulfate threshold value is established at the Basin Plan objective for the other watersheds and is included for comparison purposes.

Metals: All three samples exceeded the manganese Basin Plan objective by more than 20%, meeting the definition of persistently exceeded. All three samples exceeded the selenium CTR chronic critieria by more than 20%, meeting the definition of persistently exceeded.

PAH and PCBs: No detections.

Pesticides and Herbicides: Diazinon was detected in all three samples and one sample exceeded the chronic TMDL criteria. Disulfoton, Oxadiazon and Terbuthylazine were detected in all three samples. Atrazine and Secbumeton were detected in two samples. Carbophenothion, Dicrotophos, Dimethoate, Dioxathion, Mevinphos, DDE(p,p'), Endosulfan II, Propazine was detected in one sample.

Toxicity: Persistent toxicity was noted for both *Ceriodaphnia dubia* endpoints and for *Selenastrum capricornutum*. Two samples from April 24 and June 5, 2002, showed significant toxicity for the *Ceriodaphnia dubia* percent survival and number of young per female. No significant toxicity was found for the *Hyalella azteca* test. All three samples showed significant toxicity for the *Selenastrum capricornutum*. Toxicity data are shown in Table 3-15.

Bioassessment: Data not currently available.

Fish Tissue: Data not currently available.

Tecolote Creek Data Analysis: The creek was dry in September so no sample results are available for this date. Specific conductance, sulfate, manganese, and selenium were found to be persistently elevated. Samples from Tecolote Creek showed no discernable response to the April storm. Toxicity was found during this April storm sampling event for *Selenastrum capricornutum* unlike in the creeks which showed a response to the storm. Persistent toxicity was noted for both *Ceriodaphnia dubia* endpoints and for *Selenastrum capricornutum*. These trends are illustrated in Figure 3-12 which uses threshold values for chemical constituents as shown in Table 3-14.Table 3-14 and Table 3-15 show results for water chemistry and toxicity data respectively.

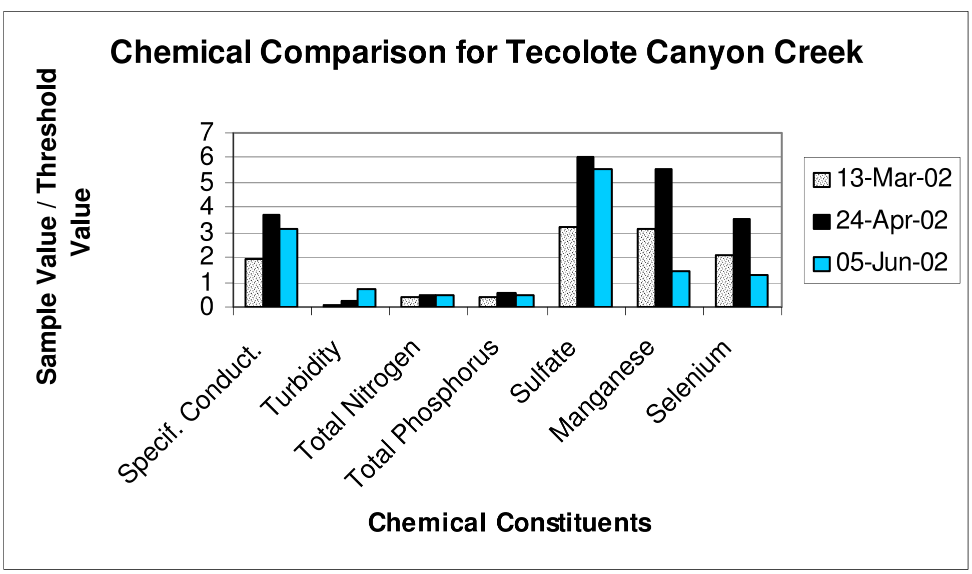

Figure 3-12. Chemical Comparison for Tecolote Canyon Creek

Table 3-14. Water Chemistry Results for Tecolote Canyon Creek

Tecolote Canyon Creek STATION 906LPTEC3 Analyte	Units	Threshold Value [a,b]	Source	Sample Date 3/13/02 Value	Note	4/24/02 Value	Note	6/5/02 Value	Note
General/Physical									
pH	units	6.5 - 8.5	BP	7.9		7.3		7.3	
Specific Conductance	mS/cm	1.6	MCL	3.1		6.0		5.0	
Temp.	^{0}C			15		16		18	
Turbidity	ntu	20	BP	2.1		5.3		15	
Velocity	fps			nd		1.3		nd	
Saturated Oxygen	%			100		87		64	
Inorganics									
Alkalinity as CaCO3	mg/L	20000	EPA	244		324		342	
Ammonia as N	mg/L	1.5 / 7.3	EPA	0.07	d	0.16		0.07	d
Nitrate + Nitrite as N	mg/L			0.044	e	0.11	e	0.122	e
Nitrogen, Total Kjeldahl	mg/L			0.37	d	0.37	d	0.37	d
Nitrogen, Total (Calculated)	mg/L		BP	0.4		0.5		0.5	
OrthoPhosphate as P	mg/L			0.023		0.034		0.014	
Phosphorus, Total as P	mg/L	0.1	BP	0.04		0.06		0.05	
Sulfate	mg/L	250	BP	798	d	1500		1390	
Dissolved Metals									
Aluminum	µg/L	1000 / 200	MCL	0.93		1.9		53	
Arsenic	µg/L	50	MCL	3.9		5.5		5.6	
Cadmium	µg/L	3.1 / 7	CTR	0.017		-0.01		0.042	
Chromium	µg/L	50	MCL	1.8		0.39		0.48	
Copper	µg/L	13 / 20	CTR	4.0		4.9		4.3	
Lead	µg/L	4.1 / 105	CTR	-0.01	c	-0.01	c	0.059	
Manganese	µg/L	50	MCL	157		279		74	
Nickel	µg/L	77 / 689	CTR	0.95		2.0		2.4	
Selenium	µg/L	5 / 20	USEPA	10		18		6.3	
Silver	µg/L	7.6	CTR	-0.01	c	0.010		-0.008	c
Zinc	µg/L	173 / 174	CTR	6.3		5.9		2.5	
OP Pesticides									
Carbophenothion	µg/L	0.03	MDL	0.04	d	-0.03	c	-0.03	c
Diazinon	µg/L	0.05 / 0.08	TMDL	0.079		0.02		0.013	d
Dicrotophos	µg/L	0.03	MDL	0.04	d	-0.03	c	-0.03	c
Dimethoate	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c
Dioxathion	µg/L	0.03	MDL	0.04	d	-0.03	c	-0.03	c
Disulfoton	µg/L	0.03	MDL	0.091		0.03	d	0.03	d
Mevinphos	µg/L	0.03	MDL	-0.03	c	0.04	d	-0.03	c
OC Pesticides									
DDE(p,p')	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c
Endosulfan II	µg/L	0.001	MDL	-0.001	c	0.001	d	-0.001	c
Oxadiazon	µg/L	0.001	MDL	0.1		0.045		0.055	
Trianzine Herbicides									
Atrazine	µg/L	1	MCL	0.1		0.035	d	-0.02	c

Tecolote Canyon Creek STATION 906LPTEC3 Analyte	Units	Threshold Value [a,b]	Source	Sample Date 3/13/02 Value	Note	4/24/02 Value	Note	6/5/02 Value	Note
Propazine	µg/L	0.02	MDL	-0.02	c	-0.02	c	0.035	d
Secbumeton	µg/L	0.02	MDL	0.21		-0.02	c	0.175	
Terbuthylazine	µg/L	0.02	MDL	0.38		0.575		0.28	
PCBs									
none exceeding MDL or RL									
PAHs									
none exceeding MDL or RL									

Notes:
a Threshold values for MCLs are presented as primary MCL / secondary MCL.
b Threshold values for water quality values are presented as chronic / acute where both are available.
c Negative values signify that the constituent was not detected in the sample.
d Calculated value 1/2 distance between MDL and RL
e Laboratory Contamination

Table 3-15. Toxicity Data for Tecolote Canyon Creek

Tecolote Canyon Creek	Toxicity Species Ceriodaphnia dubia		Selenastrum capricornutum	Hyalella azteca	
Sample Type:	grab		grab	integrated	
Matrix:	water		water	sediment	
Method	EPA 1994 (EPA 600/4-91/002)		EPA 1994 (EPA 600/4-91/002)	EPA 2000 (EPA 600R-99/064)	
Evaluation Threshold	80%		80%	80%	
Statistical Method	Paired T-test		Paired T-test	Paired T-test	
Toxic Test Duration	7 days	7 days	4 days	10 days	10 days
Toxic End Point	Survival (%)	Young/ female (#)	Total Cell Count	Growth (weight)	Survival (%)
Unit	%	Num/Rep	cells/ml	mg/ind	%
Rep Count	10	10	4	8	8
<u>3/13/2002</u>					
Mean	70	27	2368000	No Data	No Data
Standard Deviation	48.3	5	71181	No Data	No Data
Probability	0.314	0.004	0	No Data	No Data
Percent of Control	87.5	159	38.6	No Data	No Data
Tox Sig Effect Code	NSG	SG	SL	See Note below	

Tecolote Canyon Creek	Toxicity Species				
	Ceriodaphnia dubia		Selenastrum capricornutum	Hyalella azteca	
4/24/2002					
Mean	40	8	688000	0.209	81
Standard Deviation	51.6	13	73030	0.029	8.35
Probability	0.003	0.021	0	0.098	0.004
Percent of Control	40	28.8	10.6	90	86.7
Tox Sig Effect Code	SL	SL	SL	NSG	SG
6/5/2002					
Mean	40	5	205000	0.139	93
Standard Deviation	51.6	5	45092	0.029	8.86
Probability	0.037	0.005	[illegible]	0.339	0.393
Percent of Control	50	28.6	5.[illegible]	96.4	98.7
Tox Sig Effect Code	SL	SL	S[illegible]	NSG	NSG

TOXICITY SIGNIFICANT EFFECT CODES

SL - the sample is significantly different from the negative control and the sample is less than the 80% evaluation threshold (Both toxicity criteria met)

NSL - the sample is not significantly different from the negative control and the sample is less than the 80% evaluation threshold (only second toxicity criteria met, no conclusion can be drawn)

SG - the sample is significantly different from the negative control and the sample is greater than the 80% evaluation threshold (only first toxicity criteria met, no conclusion can be drawn)

NSG - the sample is not significantly different from the negative control and the sample is greater than the 80% evaluation threshold (neither toxicity criteria met)

Note:

Sediment was not collected due to the site consisting of small pebbles and large rocks.

4.0 OTHER MONITORING WITHIN THE PENASQUITOS HU

4.1 MUNICIPAL STORM WATER (MS4) PERMITTEE MONITORING

As discussed in Section 2.1, the San Diego MS4 Permittees conduct water quality monitoring within the Penasquitos HU. A summary of the results from Fiscal Year 2003-2004 are provided below.

2003-2004 Los Penasquitos Creek WMA Monitoring Results

The following summary was taken from the 2003-2004 Urban Runoff Monitoring Report prepared by MEC.

Storm Water Monitoring Summary

Elevated levels of TDS during wet weather continues to be the primary water quality concern in the watershed. High levels of other constituents, particularly fecal coliform bacteria, occur occasionally, but do not appear to be consistently problematic. There were 13 dry weather monitoring sites located upstream of the mass loading station. The data from these sites suggested that there were several constituents that exceeded the water quality objectives (particularly oil and grease), but there was no clear link between dry and wet weather constituents. There has been no toxicity associated with storm water in any of the nine storms assessed since 2001. This mass loading station has not been identified as a TIE candidate site based upon the Triad Decision Matrix.

Stream Bioassessment
The Los Peñasquitos WMA was sampled at two sites. The upstream site was in Los Peñasquitos Creek in Poway, and the downstream site was in Carroll Canyon Creek in Sorrento Valley. Both of the sites had Index of Biotic Integrity ratings that were in the upper range of Very Poor or Lower Poor categories. The Carroll Canyon Creek site was rated slightly higher than the upstream site on Los Peñasquitos Creek, possibly due to different watershed areas contributing to the different streams.

Ambient Bay and Lagoon Monitoring
Sediments in Los Peñasquitos Lagoon were monitored as part of the 2003 ABLM Program to assess the potential for adverse effects from the watershed and to compare sediment quality with other coastal embayments in San Diego County. In Phase I, a stratified random approach was used to identify the three sites where COCs were most likely to be found (i.e., those with the highest TOC and smallest grains size). These sites were sampled in Phase II of the assessment and analyzed for sediment chemistry, toxicity, and benthic community structure. The results of the chemistry assessment indicated that six of the nine metals assessed were found in the Lagoon sediments, but none exceeded its respective ERL value. The mean ERM-Q for Los Peñasquitos Lagoon was 0.109, which was slightly above the published threshold value of 0.10 and suggests a small potential for increased toxicity. Percent survival of test organisms exposed to Los Peñasquitos Lagoon sediments was significantly lower than that of the control, suggesting the presence of toxic agents in the sediments. Benthic community indices suggested that the biotic community in the lagoon sediments was intermediate compared to other embayments in San Diego County. The infaunal community was dominated by a genus of barley snail, sea slugs, and polychaete worms.

WMA Assessment
Based on the wet weather monitoring data, high TDS levels and, to a lesser extent, fecal coliform bacteria, appear to be the most problematic water quality issues in Los Peñasquitos Creek. Dry weather monitoring also suggested that oil and grease, diazinon, and dissolved copper may also be problematic. Based on data assessed, water quality appears to be good in Los Peñasquitos Creek. However, the instream benthic community appears to be limited by unknown factors. High TDS levels may be enough of a stress to insects in the marginal riparian habitats of watershed to adversely affect diversity. Unknown contaminants in the Los Peñasquitos Creek MLS watershed may also be harming the benthic invertebrate community but more study is needed. In Los Peñasquitos Lagoon, the final receiving waters for Los Peñasquitos Creek, relative rankings were fair for sediment chemistry, toxicity, and the benthic community. These results suggest that the constituents monitored in the watershed or other unknown factors may have influenced the benthic community in the Lagoon.

<u>2003-2004 Mission Bay WMA Monitoring Results</u>

The following summary was taken from the 2003-2004 Urban Runoff Monitoring Report prepared by MEC.

Storm Water Monitoring Summary
Four parameters appear to be consistently problematic in storm water runoff at the Tecolote Creek MLS: fecal coliform bacteria, TSS, turbidity, and diazinon. TSS concentrations appear to be decreasing over time, but no statistical relationships were evident for the other COCs. High levels of other constituents occur occasionally, but do not appear to be consistently problematic. There were five dry weather monitoring sites located upstream of the mass loading station that were monitored in 2003-2004. The data from these sites suggested that the water quality objectives for total coliform and enterococcus were exceeded in both dry and wet weather. There has been toxicity associated with storm water, but it appears to be related to specific storm events rather than a persistent pattern. This mass loading station has not been identified as a TIE candidate site based upon the Triad Decision Matrix.

Stream Bioassessment
The Mission Bay WMA was sampled at two sites. One site was in Rose Creek, downstream of Highway 52, and the other site was in Tecolote Creek in Tecolote Canyon Natural Park. The macroinvertebrate community of both sites had Index of Biotic Integrity ratings of Poor in October and Very Poor in May, with substantial seasonal variation in the total IBI scores. Seasonal community dynamics showed similar patterns at both sites, with percent collector filterers plus collector gatherers (represented at both sites by *Simulium*, Chironomids, and Ostracods) and macroinvertebrate density much higher in May, and with percent predators, taxa richness, and overall IBI score higher in October.

Ambient Bay and Lagoon Monitoring
Sediments in Mission Bay were monitored as part of the 2003 ABLM Program to assess the potential for adverse effects from the watershed and to compare sediment quality with other coastal embayments in San Diego County. In Phase I, a stratified random approach was used to identify the three sites where COCs were most likely to be found (i.e., those with the highest TOC and smallest grains size). These sites were sampled in Phase II of the assessment and analyzed for sediment chemistry, toxicity, and benthic community structure. The results of the chemistry assessment indicated that seven of the nine metals assessed were found in Mission Bay sediments. Of these, arsenic, copper, and lead exceeded their respective ERL values, but all concentrations were well below their respective ERMs. The mean ERM-Q for Mission Bay was the highest of any embayment assessed in the ABLM Program. In contrast to the sediment chemistry results, the percent survival of test organisms exposed to Mission Bay sediments was not significantly different from that of the Control, suggesting that the sediments were not significantly toxic to the test organisms. Benthic community indices suggested that the biotic community in Mission Bay ranked the highest of all the embayments assessed in the

ABLM Program. The infaunal community was dominated by a genus of barley snail, a marine isopod, and the Asian mussel.

WMA Assessment
Based on the wet weather monitoring data, turbidity, fecal coliform bacteria, and diazinon appear to be the most problematic water quality issues in Tecolote Creek. Dry weather monitoring also suggested that COD, TSS, total coliform and enterococcus may also be problematic, although their frequencies of occurrence were ranked as low. There was no evidence of persistent toxicity associated with samples collected from the Tecolote Creek MLS. However, the instream benthic community ranked as very poor in 2003-2004, suggesting evidence of benthic alteration. Physical habitat disturbance may play a role in the limited benthic community. Insecticides such as diazinon, which had a medium frequency of occurrence in the watershed, may also be a limiting factor. Synergistic effects and unknown contaminants in the Mission Bay watershed may also be harming the benthic invertebrate community but more study is needed. In Mission Bay, the final receiving waters for Tecolote Creek, relative rankings were fair for sediment chemistry, and good for toxicity and the benthic community. These results suggest that the constituents monitored in the watershed may have influenced the sediments, but the benthic community in the Bay has not been substantially impacted.

4.2 RWQCB BIOASSESSMENT SAMPLING

In 1997 and 1999, the RWQCB(9) contracted the California Department of Fish and Game's (DFG) Aquatic Bioassessment Laboratory (ABL) to help them incorporate bioassessment into their ambient water quality monitoring program. The DFG submitted a report titled *San Diego Regional Water Quality Control Board, San Diego Region 2002 Biological Assessment Report: Results of May 2001 Reference Site Study and Preliminary Index of Biotic Integrity.* Bioassessment sampling was conducted in May 1998, September 1998, November 1998, and May 1999 at 48 locations spread throughout the San Diego Region. A second round of bioassessment sampling was conducted in November 1999, May 2000, and November 2000. In May 2001, a third round of sampling was conducted increasing the number of sampling sites to 93 locations. Four locations in the Los Penasquitos Hydrologic Unit were sampled as shown in Table 4.1 below.

Table 4-1. RWQCB Bioassessment Sampling Locations and Dates

Location Description	**Site ID**	**Latitude/ Longitude**	**Site No**	**May '98**	**Sept '98**	**Nov '98**	**May '99**	**Nov '99**	**May '00**	**Nov '00**	**May '01**
Rattlesnake Creek: Reach consisted of 5 riffles adjacent to Hillary Park	RC-HP	N32° 57' 36.0" W117° 02' 31.2"	62	x	x	x	x	-	x	-	-
Los Penasquitos Creek: Reach consisted of 5 riffles upstream of Cobblestone Creek Road	LPC-CCR	N32° 56' 55.9" W117° 04' 06.6"	63	x	x	x	x	x	-	-	-
Los Penasquitos Creek: Reach	LPC-	N32° 56' 24.8"	64	x	x	x	x	x	-	x	x

consisted of 5 riffles upstream of Black Mountain Road	BMR	W117° 07’ 36.5”									
Carroll Canyon Creek: Reach consisted of 5 riffles near Interstate 805	CCC-805	N32° 53’ 30.3” W117° 12’ 53.9”	65	-	x	x	x	x	x	x	-
Tecolote Creek: Reach consisted of 5 riffles in the Tecolote Creek Nature Preserve	TC-TCNP	N32° 46’ 30.6” W117° 11’ 15.5”	66	-	-	x	x	x	x	x	-

A multimetric analytical approach was used to evaluate the data from these sites and develop an Index of Biotic Integrity (IBI). In this approach, a set of biological measurements (“metrics”), each representing a different aspect of the community data, is taken at each site. An overall site score is calculated as the sum of individual metric scores. Sites are then ranked according to their scores and classified into groups with “very good”, “good”, “fair”, “poor”, and “very poor” water quality.

Scoring for the May 1998 and May 1999 sampling events were abnormally low for many sites and obscured patterns in the data. To make it easier to see the patterns, data from these two sampling events was removed. The results are shown in Table 4.2 below.

Table 4-2. RWQCB Bioassessment Results

Site ID	San Diego BMI Score
RC-HP Rattlesnake Creek	Poor to Fair
LPC-CCR Los Penasquitos Creek	Fair
LPC-BMR Los Penasquitos Creek	Fair
CCC-805 Carroll Canyon Creek	Fair
TC-TCNP Tecolote Creek	Poor to Fair

4.3 U.S. GEOLOGICAL SURVEY WATER RESOURCES REPORT

In 1984 and 1985, the United States Geological Survey in cooperation with the RWQCB (9) conducted a study of water resources in the Miramar Reservoir and Poway Hydrologic Areas (HA) of the Penasquitos HU. A report was produced titled “Water Resources of Soledad, Poway, and Moosa Basins, San Diego County, California.” At that time, the Miramar Reservoir HA was called the Soledad Basin. Moosa Basin is a tributary watershed to San Luis Rey River not in the Penasquitos HU. One sample location was chosen in the Miramar Reservoir HA on Los Penasquitos Creek. Three sample locations were chosen in the Poway HA. Sample locations are described in Table 4-3 below.

For the Miramar Reservoir HA (6.10), samples were collected in October 1984 and March 1985 to represent base flow and storm flow respectively. Comparison of water quality during these two periods shows that the concentration of dissolved solids is much lower during storm flows than during base flow. At both times, the Basin Plan objective for TDS was exceeded. Concentrations of chloride and sulfate exceeded Basin Plan objectives in the base flow sample, but not in the storm flow sample. Concentrations of trace elements were negligible. Diazinon was detected in the base flow sample.

For the Poway HA (6.20), samples were only collected in March 1985 because these creeks are intermittent and no water was available in October. Los Penasquitos Creek and Rattlesnake Creek samples exceeded that Basin Plan TDS and chloride objectives. Concentrations of trace elements were negligible, and pesticides were not detected in the stream water. Beeler Creek had much different water quality from Los Penasquitos Creek or Rattlesnake Creek. Concentrations of TDS are lower in Beeler Creek and the water contains higher proportions of calcium and bicarbonate. Beeler Creeks water may have been different because the geology of the watershed is different and/or the Beeler Creek watershed was relatively undeveloped compared to the other two watersheds.

Table 4-3. USGS 1984-85 Sample Results

Sample HA	Location Description	Date of Samples	Results Summary
6.10	Los Penasquitos Creek near the eastern boundary of the HA	6-16-84 3-21-85	TDS, chloride, and sulfate objectives exceeded - base flow. TDS obj. exceeded - storm flow. Diazinon was detected.
6.20	Los Penasquitos Creek downstream of Pomerado Creek and upstream of Beeler Creek	3-20-85	TDS and chloride obj. exceeded. Sulfate near objective.
6.20	Beeler Creek at Pomerado Road	3-21-85	No exceedances noted.
6.20	Rattlesnake Creek at Commercial Road	3-21-85	TDS and chloride obj. exceeded. Sulfate near objective.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions:

1. The original SWAMP objectives contained in Table 3-1 of this report were too specific to be accomplished with the monitoring which was actually conducted. The level of resource allocated to SWAMP is not adequate to answer specific objectives relating to the specific location or aerial extent of contamination. The amount of resources available to date may be adequate to identify locations where further investigation is necessary.

2. The more recent objective to acquire information about ambient water quality conditions was accomplished. However, the value of this information is reduced due to the time lag between sample collection and data availability.

3. Specific conductance, TDS, and sulfate have been elevated in the Miramar Reservoir and Poway HAs of Los Penasquitos Creek watershed for the past 20 years according to data from SWAMP, MS4 Permitees, and the 1984/85 US Geological Society sampling. Sulfate seems to have gone from being slightly elevated in 1984/85 to being slightly elevated to being persistently elevated 20%

above the objectives in many samples. Specific conductance is related to TDS and measures similar properties of the water, but the Basin Plan has an objective for TDS, not for specific conductance. A sulfate Basin Plan objective has also been established. Water in parts of the Los Penasquitos watershed has contained TDS and sulfate above the Basin Plan objectives for the past 20 years.

4. Manganese and selenium were persistently elevated above the threshold value in parts of the Penasquitos HU. However, the selenium threshold value is not a regulatory objective, but a recommended USEPA criteria. The manganese threshold value is a Basin Plan objective and persistent exceedences should be investigated. The MS4 permitees analyze for selenium, but not manganese. Because the MS4 permittees have not found elevated selenium and because there is not a selenium Basin Plan objective, further investigation of selenium is not deemed necessary at this time.

5. Total nitrogen was persistently elevated above the Basin Plan objective at the Poway Creek sample location in all four samples and should be investigated.

6. Diazinon and other pesticides and herbicides were detected at all sampling locations and diazinon frequently exceeded acute and chronic critieria. The MS4 permitees have also identified diazinon as a constituent of concern throughout the San Diego region.

7. Several creeks had a noticeable chemical concentration and toxicity response to the storm event on April 24, 2002. There was a decrease in toxicity by *Selenastrum capricornutum* during the rainfall event. There was also decrease in specific conductivity, sulfate, and selenium and an increase in turbidity and nutrients. Manganese concentrations appeared not to be influenced by the storm event.

8. Due to the lack of bioassessment data, the triad analysis could not be fully performed. A preliminary triad analysis was conducted using bioassessment data from the MS4 permitee monitoring program and the California Regional Water Quality Control Board, San Diego Region 2002 Biological Assessment Report. Table 5-1 below shows the results of this analysis.

Table 5-1. Triad Approach Analysis for Penasquitos Watershed

Station	**Chemistry** *Persistent exceedance of water quality objectives?*	**Toxicity** *Evidence of toxicity?*	**Bioassessment** *Indications of benthic alteration?*	**Possible Conclusion Determining Action**	**Action**
906LPLC6 Los Penasquitos Creek	Yes - SWAMP specific conductance and sulfate Yes – MS4 Data Specific conductance and TDS	Yes -SWAMP *Selenastrum capricornutum* No – MS4 Data	no nearby sample	Toxic contaminants are bioavailable, but in situ effects are not demonstrable	Conduct bioassessment testing at a nearby location Evaluate differences in SWAMP vs. MS4 Data toxicity results.
906LPLSOL2 Soledad Canyon Creek	Yes - SWAMP specific conductance, sulfate, manganese, and selenium	Yes - SWAMP *Hyalella azteca* percent survival and *Selenastrum capricornutum*	no nearby sample	Toxic contaminants are bioavailable, but in situ effects are not demonstrable	Conduct bioassessment testing at a nearby location
906LPPOW2 Poway Creek	Yes - SWAMP specific conductance, total nitrogen, manganese, and selenium	Yes - SWAMP both *Hyalella azteca* endpoints and for *Selenastrum capricornutum*	no nearby sample	Toxic contaminants are bioavailable, but in situ effects are not demonstrable	Conduct bioassessment testing at a nearby location
906LPRSC4 Rose Canyon Creek	Yes - SWAMP specific conductance, sulfate and selenium	Yes - SWAMP *Hyalella azteca* growth weight and *Selenastrum capricornutum*	Yes Poor to Very Poor	Strong evidence of pollution-induced degradation	Conduct TIE to identify contaminants of concern, based on TIE metric, initiate TRE
906LPTEC3 Tecolote Creek	Yes - SWAMP specific conductance, sulfate, manganese, and selenium Yes – MS4 Data Turbidity and TSS	Yes - SWAMP both *Ceriodaphnia dubia* endpoints and for *Selenastrum capricornutum.* No – MS4 Data	Yes Fair to Very Poor	Strong evidence of pollution-induced degradation	Conduct TIE to identify contaminants of concern, based on TIE metric, initiate TRE Evaluate differences in SWAMP vs. MS4 Data toxicity results.

5.2. Recommendations

The monitoring conducted in the Penasquitos HU during 2002 was an initial step in accomplishing the SWAMP objectives listed in Table 3-1 of this report. Although these objectives are too specific to be accomplished with SWAMP data alone, the SWAMP data, supplemented with the results of other monitoring referenced in this report presents an overview of surface water quality conditions in the Penasquitos HU at the start of the 21st century. The challenge at this time is to build upon this data and develop a coordinated program to focus future water quality assessment efforts and resources on the priority water quality issues in the watersheds. The recommendations identified below are intended to address program deficiencies as well as potential water quality impairments.

1. Revised SWAMP objectives should be developed to more accurately reflect the level of resources available for SWAMP. SWAMP objectives could be changed to:
    - Use several critical threshold values of toxicity, benthic community analysis, habitat condition, and chemical concentration to obtain general information about the water quality in the watershed.
    - Use SWAMP as a framework to coordinate a comprehensive regional ambient monitoring program that incorporates all other monitoring in the watershed including stakeholders, dischargers, and other state programs or agencies.
    - Identify locations where further investigation of a potential water quality violation is needed.

2. Monitoring required by the Regional Board as a regulatory requirement (e.g., MS4 permit), supported by grants and other state funding sources, and special studies should be coordinated under the SWAMP program. This would ensure that duplicative sampling is not occurring and that sampling efforts are maximized.

3. A monitoring site should be added on Beeler Creek. The US Geological Society (USGS) found significantly different water quality including reduced TDS in Beeler Creek compared to Los Penasquitos Creek and Rattlesnake Creek. The water quality differences were thought to be related to differences in geology and level of development. A monitoring site could be used to evaluate if the TDS is a factor in stressing the instream benthic community of Los Penasquitos Creek, Rattlesnake Creek, and Carroll Canyon Creek.

4. TDS should be added to the monitoring constituents for SWAMP. There are Basin Plan objectives for TDS, but not for specific conductance. Although the two constituents are related such that they increase and decrease together, an exact measurement of TDS would be preferable.

5. TDS, sulfate, manganese, and selenium data should be evaluated with the bioassessment data when it becomes available to determine the need for a TIE.

6. More sampling and research should be conducted to determine if TDS, sulfate, and manganese are causing water quality impairment in the watershed. It is not known if manganese concentrations have been elevated in the long term. Additional research could also assist in determining if the source is natural or man-made, and potential BMPs or other measures needed to reduce the concentrations. MS4 permittee monitoring should be revised to include monitoring for manganese and sulfate.

7. Selenium was not detected or was below the threshold value in all samples on Los Penasquitos Creek and Tecolote Creek MS4 permittee mass loading stations. Because the threshold value used in this report is not a regulatory value and previous MS4 samples have not indicated a problem, no further action is recommended on selenium.

8. Additional sampling and/or investigation should be initiated on Poway Creek to determine the source of the elevated nitrogen.

9. Future sampling efforts should avoid collecting samples during a rain event. The objective of the SWAMP program to gather ambient water quality information is not accomplished by incorporating storm water samples. The rain event on April 24, 2002, noticeably altered the water quality away from ambient conditions. It is not know how long the water quality remains altered. Even in winter, rain events in San Diego are not usually very frequent. The limited resources available for SWAMP should be focused on gathering information which is applicable a majority of the time.

10. Consideration should be given to having the MS4 permittees collect mass loading samples at times when it is not raining. SWAMP data indicates a difference in water quality during the rain and during a dry spell. This rainfall phenomenon should be investigated to determine if it occurs consistently or if it was a one time occurrence.

11. The laboratory who performs the analysis should be responsible for developing and presenting the Quality Assurance and Quality Control (QA/QC) information. The data is currently in the SWAMP database, but is difficult to extract in a meaningful format without becoming an expert in Access and the SWAMP database. Some of the QA/QC protocols were violated, but no explanation was provided such at holding times violated or batches where laboratory method blanks were not performed. The laboratory should provide not only QA/QC tables, but text to interpret the tables, explain the acceptable control limits for each type of QA/QC sample, and explain why QA/QC protocols were not followed. Some of the QA/QC protocols were violated, but no explanation was

provided such at holding times violated or batches where laboratory method blanks were not performed.

12. The SWAMP data needs to be finalized quicker and be more easily and readily available to the staff and the public. The SWAMP data being evaluated in this report is from 2002, three years ago. At this point not all of the data collected during the 2002 sampling is available such as the bioassessment data and fish tissue data. The SWAMP data is available is in a password protected database and is not readily accessible to board staff or the public. In addition, the database is not presented in an easily useable format. The database should be amended to include, not only queries, but also reports of the data in a more useable format. An instruction manual should be developed for the dtatabase including directions for setting up the computer to enable access, names and descriptions of all tables, queries, and reports, and table linkages. Efforts should be made for future SWAMP data to be finalized on a quicker timeframe, for the data to be made readily available to staff and the public, and for the database format to be more user friendly.